The Iron Age

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The Manufacture of Charcoal in Kilns.*

BY T. EGLESTON, PH. D.

The manufacture of charcoal in kilns was declared many years ago, after a series of experiments made in poorly constructed furnaces, to be unprofitable, and the subject is dismissed by most writers with the remark that in order to use the method economically the products of distillation, both liquid and gaseous, must be collected.

Besides iron, there are other manufactures in which large amounts of charcoal were used, but these consumers seem to have been guided entirely by the results of the experiments of the iron men, who necessarily made the largest quantity of it. Some authors speak in a doubtful way of the quality of the charcoal produced, and a few concede that with great care good charcoal can be made in kilns, but that most of the workmen do not like kiln charcoal. This is the real secret of the opposition to this method of manufacture.

Until recently the manufacturers of charcoal iron have considered meiler or pit coal superior to kiln-made coal, but the manufacture of this latter kind of coal has been so much improved of late years that it is sometimes difficult for the advocates of meiler coal to distinguish the difference between the two. Occasionally the question of the sale of the accessory products was a factor. It is generally agreed that kilns give a better yield than meilers, but it is objected that the charcoal is not so strong for blast furnace use. For other uses there does not seem to have ever been much question.

The question of pit or kiln coal was formerly settled by the cost of transportation. When transportation was low, kilns were used, the advantage of output being greatly in their favor, since the kiln can be burned slow or fast to make the coal of requisite density. The yield of charcoal is also greater in the kiln than in the meiler, it being from 45 to 50 bushels to the cord in the kiln, and from 30 to 35 in the meiler. The amount of labor in using the kiln is also less. To counterbalance the increase in yield, the decrease in labor, the security against accident, and the celerity of the operation, the cost of transportation will have to be high.

Besides this, the kiln is always under complete control, and can be examined by the burner at any time, and the exact condition of every part of it can be ascertained at every step in the process. As there is only an approximate knowledge and control of the meiler, the kiln should give the best product. The possibility of a large output is, however, the *ignis fatuus* of modern metallurgy. The kilns are "turned" so often that the charcoal is burned too rapidly, and the quality becomes poor. In the desire to have but few structures to take care of, and to have the largest possible furnace capacity with the least expense, the kilns have been made too large. Experience has shown, however, that it is more economical to use kilns of small capacity, and that the increase in the cost of the structures is more than compensated for by the increase in the quality of the product; while with large kilns the diminished cost of the plant is dearly purchased at the expense of a diminished yield of coal, and by the relatively poor quality of the product.

There seems to be no doubt that, given the peculiar conditions necessary for the construction of permanent works, the charcoal manufactured in kilns is cleaner, since it is free from the sand of the cover of the meiler, and is also denser if the process is conducted slowly. The yield is at least from 15 to 20 per cent. more, and the expense is at least one third less. In addition to this, as the meilers are at a distance, there is a loss of charcoal in transportation amounting to 10 to 15 per cent., so that the total gain in kiln manufacture is from 25 to 30 per cent. If the process was conducted as slowly, there is little doubt that the kiln coal would be equal, if not superior, to the meiler coal.

The only valid objection to kilns is their permanent character. In order to avoid the great cost of transporting all the wood, these works must generally be situated in a country where there are streams or lakes which can be utilized for rafting or floating, or where the cost of carriage is very low, as the cost of transportation must be borne by only a small part of the material transported. But, as we have said, there are very few localities suitable for metallurgical manufactures where the interest and sinking fund on the permanent investment and the cost of transportation, will overbalance the diminished cost of manufacture and the increase in the yield.

Charcoal has been studied almost exclusively in view of the manufacture of iron in the blast furnace. It is generally conceded now that it will not be much longer used on a large scale for that purpose. Less attention is, therefore, now paid to it than its merits as a furnace fuel warrant. There are districts where no other fuel can be had, and there are processes in which it must be used so long as they exist. For making blooms direct from the ore kiln charcoal is almost universally used. As between hard and soft woods the impression among the workmen seems to be that the quality of the iron made with soft wood is better than that made with hard wood, but the consumption of the softer fuel is greater. There are besides some ores of iron of exceptional purity, but so lean that they can hardly be worked in the blast furnace. To be worked at all they must be crushed and dressed, and it is only practicable to treat the fine ore thus produced in a bloomary with charcoal. In such districts the kiln has a peculiar importance, as it gives a charcoal free from dirt, a very important consideration, as the whole object of dressing the ores is to get rid of the silica, and if dirt were introduced in the fuel the loss of iron would not only be increased, but the benefit derived from dressing the ores very much diminished.

Kilns for the manufacture of charcoal are made of almost any shape and size, determined, in most cases, by the fancy of the builder, or by the necessities of the shape of the ground selected. They do not differ from each other in any principle of manufacture, nor does there seem to be any appreciable difference in the quality of the fuel they produce, when the process is conducted with equal care in the different varieties; but there is a considerable difference in the yield and in the cost of the process in favor of small over large kilns. The different varieties have come into and gone out of use mainly on account of the cost of construction and of repairs. The object of a kiln is to replace the cover of a meiler by a permanent structure. Intermediate between the meiler and the kiln is the Forcauld system, the object of which is to replace the cover by a structure, more or less permanent, which has all the disadvantages of both systems, with no advantages peculiar to itself.

The kilns which are used may be divided into the rectangular, the round and the conical, but the first two seem to be disappearing before the last, which is as readily built and much more easily managed.

All varieties of kilns are usually built of red brick, or, rarely, of brick and stone together. Occasionally refractory brick is used, but it is not necessary. The foundations are usually made of stone. There are several precautions necessary in constructing the walls. The brick should be sufficiently hard to resist the fire, and should, therefore, be tested before using. It is an unnecessary expense to use either second or third quality fire-brick. As the pyroligneous acid which results from the distillation of the wood attacks lime mortar, it is best to lay up the brick with fire-clay mortar, to which a little salt has been added; sometimes loam mixed with coal tar, to which a little salt is also added, is used. As the principal office of this mortar is to fill the joints, special care must be taken in laying the bricks that every joint is broken, and frequent headers put in to tie the bricks together. It is especially necessary that all the joints should be carefully filled, as any small open spaces would admit air, and would materially decrease the yield of the kiln. The floor of the kiln was formerly made of two rows of brick set edgewise and carefully laid, but latterly it is found to be best made of clay; any material, however, that will pack hard may be used. It must be well beaten down with paving mauls. The center must be about 6 inches higher than the sides, which are brought up to the bottom of the lower vents. Most kilns are carefully pointed, and are then painted on the outside with a wash of clay suspended in water, and covered with a coating of coal tar, which makes them waterproof, and does not require to be renewed for several years.

The wood used is cut about 4 feet long. The diameter is not considered of much importance, except in so far as it is desirable to have it as nearly uniform as possible. When most of the wood is small, and only a small part of it is large, the large pieces are usually split, to make it pack well.

It has been found most satisfactory to have three rows of vents around the kiln, which should be provided with a cast-iron frame reaching to the inside of the furnace. The vents near the ground are generally 5 inches high, the size of two bricks, and 4 inches wide, the width of one, and the holes are closed by inserting one or two bricks in them. They are usually the size of one brick, and larger on the outside than on the inside. The holes are usually from 17 to 23 inches apart vertically, and from 31 to 35 inches apart horizontally. The lower vents start on the second row of brickwork above the foundation, and are placed on the level with the floor, so that the fire can draw to the bottom. There is sometimes an additional opening near the top to allow of the rapid escape of the smoke and gas at the time of firing, which is then closed and kept closed until the kiln is discharged. This applies mostly to the best types of conical kilns. In the circular and conical ones the top charging door is sometimes used for this purpose. Hard and soft woods are burned indifferently in the kilns. Hard-wood coal weighs more than soft, and the hard variety of charcoal is usually preferred for blast furnaces, and for such purposes there is an advantage of fully 33⅓ per cent. or even more in using hard woods. For the direct process in the bloomaries soft-wood charcoal is preferred. It is found that it is not usually advantageous to build kilns of over 160 to 180 cubic meters in capacity. Larger furnaces have been used and give as good a yield, but they are much more cumbersome to manage. The largest yield got from kilns is from 50 to 60 bushels for hard wood to 50 for soft wood. The average yield, however, is about 45 bushels. In meilers 2½ to 3 cords of wood are required for 100 bushels, or 30 to 40 bushels to the cord. The kiln charcoal is very large, so that the loss in fine coal is very much diminished. The pieces usually come out the whole size, and sometimes the whole length of the wood.

Rectangular Kilns.—The rectangular kilns were those which were formerly exclusively in use. They are generally constructed to contain from 30 to 90 cords of wood. The usual sizes are given in the table below:

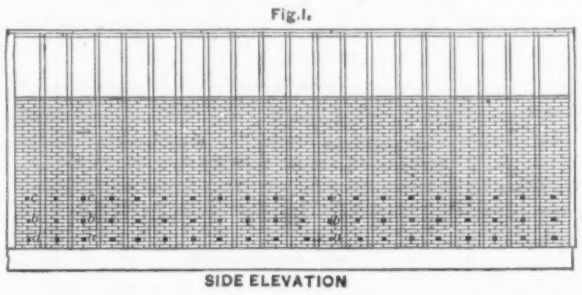
	I	II	III	IV
Length	30	40	40	48
Width	12	15	14	17
Hight	12	15	18	18
Capacity in cords	55	70	75	90

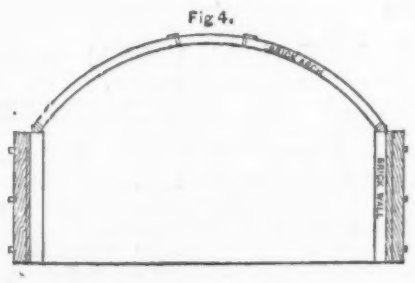
I and II, used in New England; III, type of those used in Mexico; IV, kiln at Lauton, Mich.

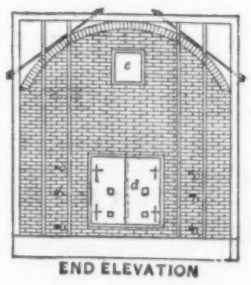
The arch is usually an arc of a circle.

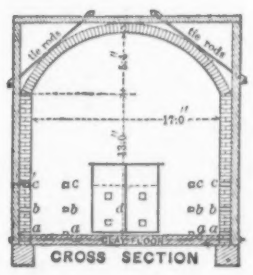
A kiln of the size of No. IV, as constructed at the Michigan Central Iron Works, with a good burn will yield 4000 bushels of charcoal.

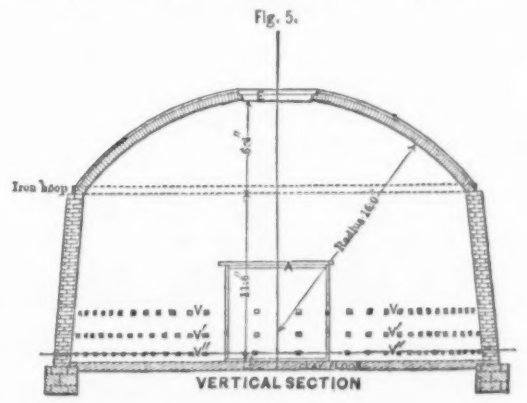
The vertical walls in the best constructions are 12 to 13 feet high and one and a half brick thick, containing from 20 to 22 brick to the cubic foot of wall. To insure sufficient strength to resist the expansion and contraction due to the heating and cooling, they should be provided with buttresses, which are one brick thick and two wide, as at Wassaic, N. Y., Fig. 3; but many of them are built without them, as at Lauton, Mich., Fig. 1. In both cases they are supported with strong braces, from 3 to 4 feet apart, made of round or hewn wood, or of cast iron, which are buried in the ground below, and are tied above and below with iron rods, as in Figs. 1, 2 and 3, the lower end passing beneath the floor of the kiln. When made of wood they are usually 8 inches square or round, or sometimes 4 by 8 placed edgewise. They are sometimes tied at the top with wooden braces of the same size, which are securely fastened by iron rods running through the corners, as in Fig. 1. When a number of kilns are built together, as at Michigan Central Iron Works, at Lauton, Mich., only the end kilns are braced in this way. The intermediate ones are supported below by wooden braces, securely fastened at the bottom. The roof is always arched, is one brick (or 8 inches) thick, and is laid in headers, 14 being used in each superficial foot. Many of the kilns have in the center a round hole from 16 to 18 inches in diameter, which is closed by a cast iron plate. It requires from 35,000 to 40,000 brick for a kiln of 45 cords, and 60,000 to 65,000 for one of 90 cords. At one end are two doors—one above and one below (Fig. 1), both of which are used for the introduction of the wood; at other times there is only the lower

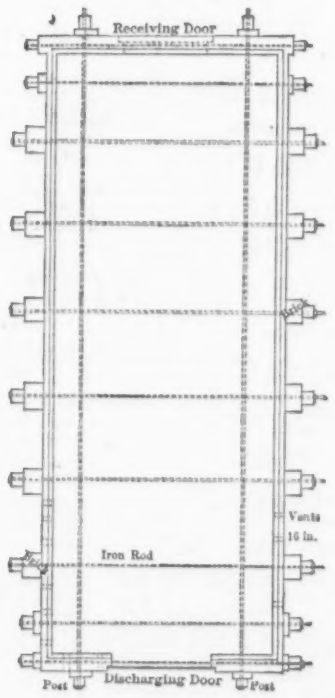


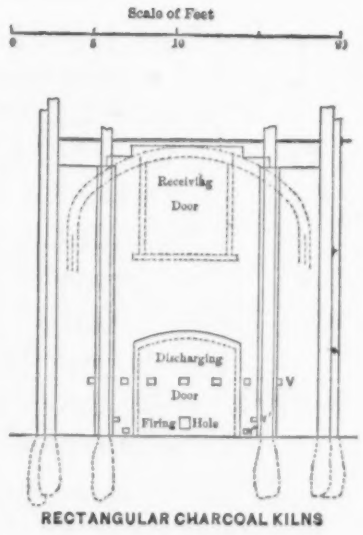












CONSTRUCTION OF RECTANGULAR, CIRCULAR AND CONICAL CHARCOAL KILNS.

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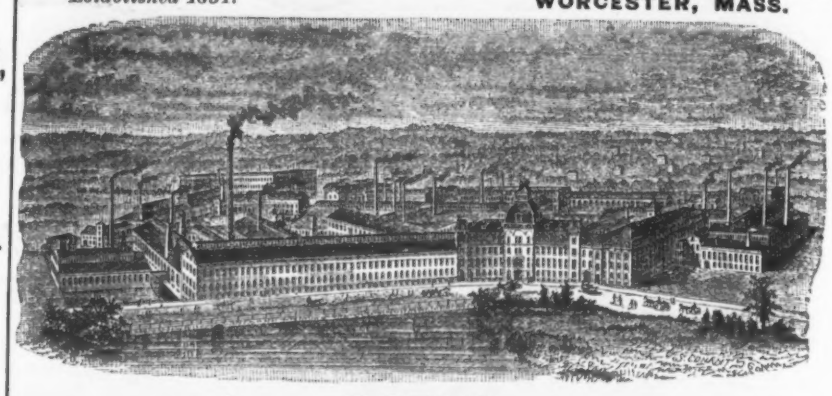

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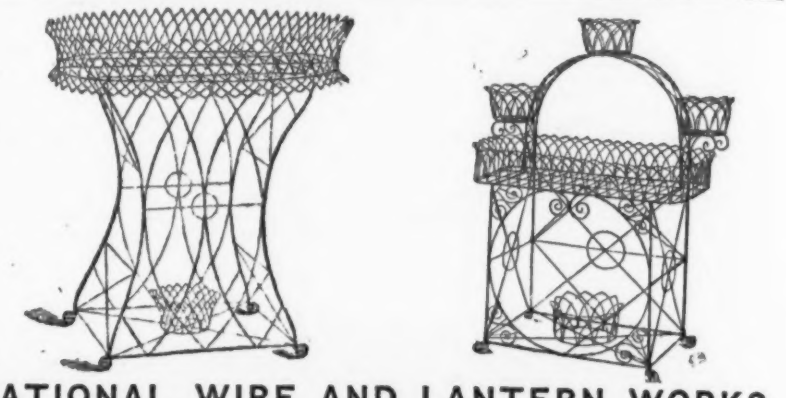

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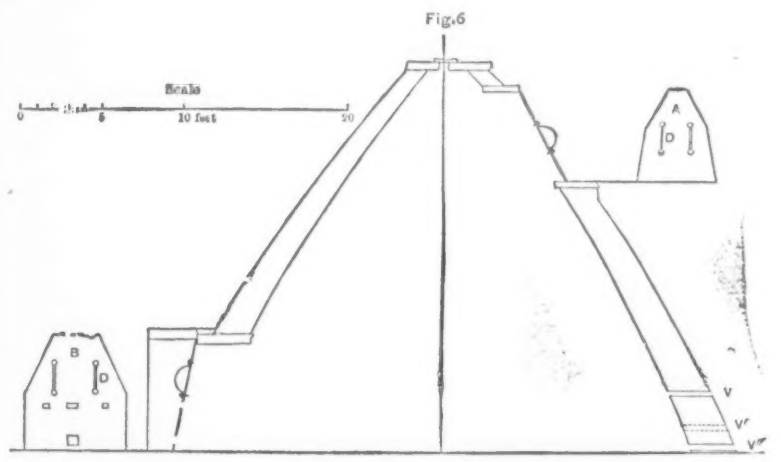
one. The discharge of the charcoal is made by the lower doors only.

The number of vents is regulated by the way the bracing is done. When wood only is used, as in Fig. 1, there is only one, but when brick buttresses are used, generally three. They are almost always placed one directly over the other. To each of these a name is given. The lower one, Fig. 1, is called the foot vent, the middle one the knee vent, and the upper one the shoulder vent. On the ends of the kiln the vents are placed less regularly than on the sides. Sometimes there is only one row, one above the other, as in Figs. 1 and 2, sometimes one row not in line, as in Fig. 3, and sometimes there are more. From three to four vent holes

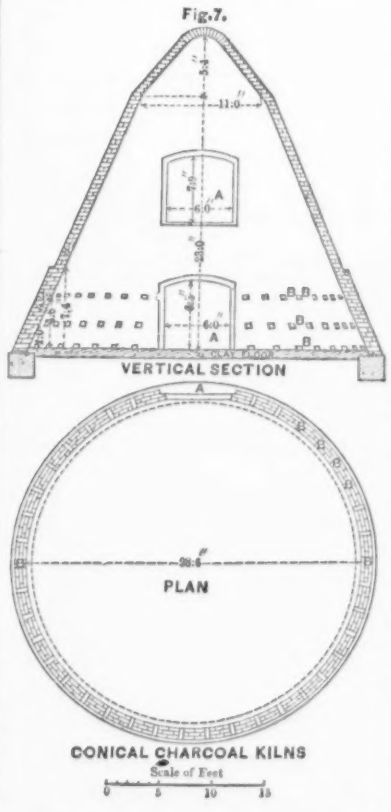
Fig. 6



are usually made in the lower doors. These openings are usually of a size to admit a single brick. They are placed on the level of the ground and up to a hight of one and two feet.

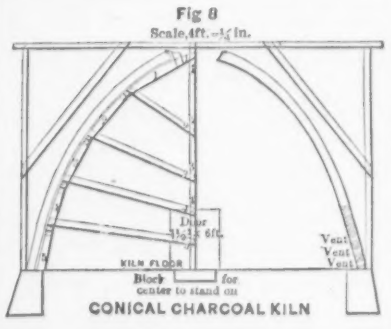
The lighting of a kiln is sometimes done by a chimney left in the wood in the center from above, exactly as in the meiler, the fire being drawn down by the openings in the sides; this chimney may or may not connect with a channel leading to the discharging door. This method is used in the South and Southwest of the United States, and is practiced in Mexico, and is preferred when the

Fig. 7.



kilns are very wide. It is considered by many to give the best results, both as to yield and quality of charcoal. Sometimes the lighting is done by means of a channel built through the middle of the kiln, having an opening at each door. This is also filled with dry wood and shavings, which are lit from the back door. The fire is then drawn through the wood to the front door by properly manipulating the vents. When the fire has reached the front both doors are closed, as the whole kiln is then lighted. This method is called the center burn. In both

Fig 8



CONICAL CHARCOAL KILN

these last methods, as the fire is generated in the wood, the heat does not affect the walls of the kiln. The time required for these methods is not more than half that of the first method. A 65-cord kiln can be easily turned twice in four weeks, which is ample time. As 24 turns can be made in a year, the capacity of the kiln is doubled.

In the Mexican type of furnace (No. III), where the lighting is done from the center, the work is much more slowly done. It takes them four days to burn, six to cool, and four to empty, or 20 days in all, so that only 18 turns a year are made. The operation is easily and regularly conducted providing the walls are tight. The clear blue smoke appears about the fourth, fifth or sixth day, when the vents must be successively closed. Four to eight days are required for cooling.

The whole art of the process consists in closing the vent holes at the proper time. As soon as the kiln is well lighted the two lower rows are closed. The vents of the upper row are closed little by little. Those of the middle in the upper row are usually closed first; then those from which the blue smoke comes in their turn. When the vents of the first row are being closed those of the middle are opened, and so on. One man by day and one by night can easily superintend five to six such kilns. He has little to do except to draw the fire regularly down, to watch the color of the smoke, so as to close the vents at the proper time, and to fill any cracks that may form. It is always safer to allow the kiln to remain a longer than a shorter time to cool. If the kiln is properly extinguished four men can easily empty it in one day. On the floor there will usually be found some badly burned wood; these brands are either put back in the next charge or used for special purposes about the works. If occasion required, they might be used mixed in small quantities with the charcoal.

Mr. T. F. Witherbee gives the following table as the weights of the charcoal made by him in rectangular kilns at the Fletcherville furnace:

	Lbs. per bushel.
White pine	9.800
Basswood	10.625
Spruce	11.250
Poplar	12.275
Hemlock	12.850
Black ash	14.475
White ash	16.325
Beech	17.025
Yellow birch	18.750
Sugar maple	18.950

Round Kilns.—The round kilns, Figs. 4 and 5, differ from the rectangular ones only by their shape. Fig. 4 shows the form usually employed among the bloomary forges of Northern New York; Fig. 5 is that employed for blast furnace fuel in Vermont; Fig. 4 is built with vertical walls and is braced with wooden posts and iron straps. Such kilns can be seen near Roger's Rock, on Lake George, and at Black Brooke, Essex County, N. Y.; Fig. 5 is built with battered walls, which are 28 feet at the base and 26 feet at the spring of the arch, and has no bracing. In all other respects the kilns are similar. The arches of both these kilns are supported by iron rings at their base. They have three rows of vents, one at the base, with six courses of brick between each of the others. These vents are 2 x 4 inches and 18 inches apart. They are usually 28 to 30 feet in diameter at the base, and 26 to 28 feet at the the spring of the arch. The vertical walls are 11 to 12 feet to the spring of the arch and 1 foot thick. The arch is 8 inches thick and is laid in headers. Such a kiln will have about 300 cast-iron vents, which weigh about 8 pounds each. Thus a capacity of from 40 to 45 cords requires more precautions in building when the walls are not battered, and besides the usual braces, must be hooped with strong iron bands. The doors are made of No. 10 sheet iron. The top opening is a cast-iron ring, which together with the lintel of the door weighs about 1500 pounds. The wrought-iron bands around the kiln weigh about the some. They require about 36,000 brick. These kilns are usually built against a bank, so that the top can be reached from it.

With ordinary facilities it takes four or five men one day to fill a 45-cord kiln with wood 4 feet long. Where butt ends of logs are used it takes 12 hours to fill a 35-cord kiln; but these can be tumbled in, and do not require much handling. The kiln is fired with a long torch through the door at the bottom, through the space left at the skids. At the time of firing the vents are all open, but as soon as the lighting is finished the two lower rows, as well as all the other openings, are closed with loose brick. It takes about 10 to 12 days to burn a 50-cord kiln, and about 6 to 7 to burn a 35-cord one.

It takes from 5 to 6 days after all the vents have been closed to cool a kiln of from 35 to 50 cords. The covers of the doors are of sheet iron, and so long as there is any heat in the kiln it will be felt on these doors. As soon as these are cold the kiln is cool enough to draw. It is generally the practice to let the fire die cut. It is not usual to hasten the cooling by throwing in water, as it impairs the value of the charcoal for blast furnace use. When used for other purposes, however, from 8 to 10 barrels of water are sometimes thrown in at the top after the kiln has been closed for three days. It will take four men about a day to draw a kiln of 50 cords.

The chief objection to the rectangular and round kilns is their want of stability. The rectangular kilns require to be braced with wood and iron, while the circular kilns, which offer no advantages over the rectangular, must in addition be hooped with iron. This makes this kind of structure expensive in the first place. The less expensive structure, Fig. 5, does not last much longer. The contraction and expansion which the bracing is intended to prevent does take place, and after a time there will be numberless air-channels in the shape of cracks in the walls, which cannot be effectively closed, which will both increase the difficulty of management and decrease the yield in charcoal. Kilns of this shape are being rapidly given up. It has been found much more economical to construct and to manage small conical

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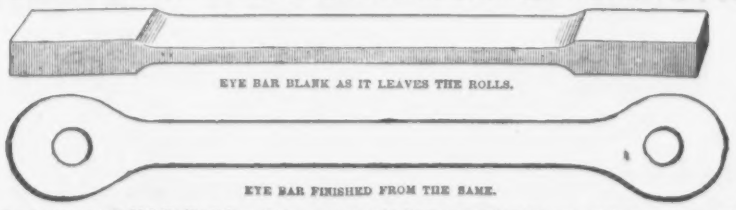

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kilns than large round ones, and these conical kilns are gradually taking the place of the large ones of other shapes.

Conical Kilns.—The conical kilns are generally smaller than either of the other varieties. They are usually from 20 to 25 feet high, and from 25 to 30 feet in diameter, and are intended for 25 to 45 cords of wood. They are constructed in such a way as to require no bracing of any kind. They are often built into the side of a bank, a part of the earth of which is removed so as to make a charging door near the top on a level with the ground; or they may be built on a plain, in which case there is no upper door, but only a charging hole in the top, which is reached by a ladder in order to close it.

The usual dimensions of these kilns are:

	Diameter at Base. Feet.	Hight. Feet.	Capac. Cords.
American Fork Cañon, Utah..	26	20	25
Norton's Iron Works, Plattsburg, N. Y.	30	20	35
Wassaic, N. Y.	30	23	40
Readsboro', Vermont.	28.6	28	45

There are three types of this kind of kiln, shown in Figs. 6, 7 and 8. 1. That at Readsboro', Fig. 7, in which the top of the cone is at a different angle from the bottom; there are two doors of the same size for charging. 2. That at Wassaic, Dutchess County, N. Y., Fig. 6, in which the cone has but one angle; there are two charging doors of slightly different size, and a hole in the top of the kiln to be used in firing. 3. That at Plattsburg, No. 8, in which the conical form is the same throughout; there are two charging doors, one below and the other in the top of the kiln. This last form is, on the whole, the best of all, being the simplest in construction and easiest to manage.

At Norton's Iron Works, near Plattsburg, N. Y., Fig. 8, the wall is built with a batter of 3 inches to the foot up to 6 feet. At this point, the hight of the kiln being determined as 20 feet, a perpendicular is raised, and somewhere on this line a center is found from which an arc of a circle will meet the flange of the charging hole at the top, which is made of a cast-iron ring 4 feet in diameter and 8 inches deep, projecting 6 inches over the top. This makes the wall a little thinner at the top than the bottom. The flange of the ring is normal to the curve of the masonry, which is generally built of red brick (Fig. 8 shows the way this kiln is constructed). Sometimes the kilns are made of stone, which need only be strong enough to resist the low heat of the operation. Constructed in this way the kiln requires no braces of any kind.

It takes 33,000 brick to construct the Plattsburg kiln, and about 40,000 brick to build the one at Readsboro'. The floor of the kiln is very nearly level, and on the sides comes up to the bottom of the lower tier of vents. The kiln has three rows of vent holes, which usually commence on the level ground. They start on the second row of brickwork above the foundations; the floor or hearth is brought up to this level. These vents are from 2 feet 6 inches to 3 feet from center to center. In some kilns the vents are arranged in quincunx, so that the upper and lower rows have 24 vents—the middle one 26. In others they are one over the other—sometimes as many as 40—and the same number in each row. In most kilns these openings are at equal distances apart, which is usually 18 to 20 inches.

It is always wise to use cast-iron vents. If no protection to the brick is used, the pyroligneous acid attacks the mortar, which falls first around the brick and then above it, and in this way cracks of considerable size may be formed in the mortar around the bricks, which it is almost impossible to fill. The additional cost of the cast-iron vent hole is about $75 to the kiln, but it will save more than this in the cost of repairs in a few years. The cast iron effectually prevents the action of the pyroligneous acid on the mortar. In the best kilns there are three to four bricks between each vent.

Each kiln is usually constructed to hold 35 cords of wood, solid measure. This is intended to yield 1750 bushels, which is 50 bushels to the cord. Either soft or hard wood can be burned; the former is generally used in the manufacture of blooms, and is preferred by many workmen.

At the Norton Iron Works, at Plattsburg, N. Y., the charcoal for the blast furnace and for knobling fires is made of slabs, butt ends of logs and flood-wood. This is brought to the kiln in a hand cart that holds about half a cord. The bottom of the kiln is prepared as usual. Butt ends of logs are then piled just above the top vents. Slabs are then put in up to 6 feet; then flood-wood about 4 feet long is placed, until it is no longer convenient to handle it; the filling is then finished with blocks or butt ends of logs.

The yield of the kilns at Norton's works is often as high as 60 bushels per cord for hard, and 50 for soft wood. The average is about 50 bushels. It takes four men and two horses one day to fill the kiln. One man is required in the kiln, and three to draw. Two men can empty it in a day. The coal at Norton's works is carried from the kiln to a shed, only about 30 to 40 feet distant, which is 40 feet deep, having a peaked roof. The building is 275 feet long. There are 13 kilns here, and four at 12 miles distant, built of firestone, which hold 50 cords each. It requires eight men for the 13 kilns. These 13 kilns can make 22 turns a year. Working so fast makes it difficult to burn the charcoal thoroughly, so that they usually run only 18 kilns a year. It requires 13 days to fill, burn and empty a 35-cord kiln. It takes one day to fill and one to empty it.

It seems to be very generally conceded in the Eastern States that the conical kilns holding from 25 to 35 cords are the most profitable. They are less expensive in construction, more easily filled, cheaper to manage, give a better yield, and can be turned more frequently than any of the other varieties of kilns. At Plattsburg, in 1879, it cost $7.50; on Lake George, $7, and in a few localities in Vermont $6 per 1000 bushels to fill, burn and empty; the average will be from six to seven cents.

The per cent. of brands in a well burned kiln will be from one cord in 17.5 cords to one in 18.5. It takes for a 50 cord kiln 12 days, for a 35 cord kiln nine days. The charging requires one day for four men for 35 cords, and one day for five and six men

for 50 cords. Two horses are used for the 35-cord kiln at Plattsburg, but the whole work is often done by men with wood barrows. The cost of these kilns will vary with the locality, depending on the local cost of the materials used. It will cost about $500 to build a conical kiln of from 35 to 50 cords in Plattsburg, and about $600 in Michigan, with brick at $17.50 per thousand. There seems to be no doubt that the Plattsburg kiln, with iron vent holes, is the best type of all the kilns. If properly built it lasts a long time without repairs of any kind, except an occasional replacing of the clay-tar wash on the outside. At Plattsburg anything in the shape of wood is made into charcoal by it, and while it is not generally advisable to use drift and refuse woods in current manufactures, it can be done if necessary. Such kilns as this can be built by almost any man. They are much easier to take care of than meilers, and in the remote districts, where charcoal is now used as a metallurgical fuel, present every advantage of economy of construction and management, as well as maximum of yield.

Modern Steel as a Structural Material.

M. W. Worby Beaumont read a paper before a recent meeting of the Society of Engineers, which contains much that deserves careful consideration. Mr. Beaumont's argument that we seem in danger of losing the facilities for producing lighter structures, which the application of steel seemed at one time to warrant, is a sound one so far as it goes. He seems, however, to forget that "steel" is a misnomer for many of the products of modern metallurgical processes, which differ from iron only in that they possess properties due to their having been produced by fusion instead of agglomeration. With this in mind, Mr. Beaumont's paper, which we give below, will be read with interest.

For several years the substitution of steel for iron in various structural work has occupied the attention of engineers and metallurgists, but the progress which has been made, compared with the hopes that were entertained when steel made by the Bessemer process became cheap enough to make its cost, strength for strength, comparable with that of iron, has not been great. There are classes of structures in which a reduction in weight would be a material advantage, even when attended with an increased total cost. Ships, boilers and girders may be instanced as examples. In this direction, therefore, engineers turned their attention, with a view to the application of steel. The difficulties, however, which attended the manipulation and connection of steel in structures largely composed of plates checked its application. Many failures attended the attempts to use it, chiefly resulting from apparently anomalous behavior of the metal under what were considered similar conditions, but more, perhaps, owing to the special treatment which it required as compared with iron. Those who had been long accustomed to the manipulation of iron were unable to depart from past practice sufficiently to operate upon the new material with all the careful attention to its different properties which these demanded. Thus, although the difference in its behavior in the hands of the smith and plate worker, as compared with iron, was considered in several of the details of manipulation, certain other peculiarities were lost sight of in the assemblage of parts, which resulted in the destruction of work when almost completed. Even 20 years ago, before the modern cheap steels had been offered, steel made by the crucible process had been successfully employed on a small scale for boiler work. Very careful attention to the behavior of steel under treatment had no doubt been observed, as it might easily be on a small scale; but when, some years after, attempts were made to use Bessemer steel for boiler and bridge work, difficulties arose, some of which were attributed to the nature of the material and some to the want of thorough care on the part of the workmen. Even when plates of this material cost more than iron for boiler construction, and very much more than iron for bridge and girder work, attempts were made to use it for the latter on account of the several advantages which would arise from a decrease in the permanent load of bridge structures. Failures, however, of parts of these structures, both before and after completion, due to the want of the observance of the special treatment which the material demanded, discouraged its employment. The endeavors of steel makers during the past few years have, therefore, been directed to the production of steel possessing properties so far similar to wrought iron that no great departure from the methods of working this material need be made. Apart from the frequent want of uniformity in the mechanical properties of the Bessemer steel plates of a few years ago, it generally exhibited an absence of toughness, which not only made it difficult of manipulation in the hands of the plate smith, but caused its destruction after being built into a structure. Its uncompromising rigidity rendered it incapable of accommodating itself to, and gradually eliminating from, itself, the residual strains originating in unequal heating and cooling, and also to the unequal strains visited upon it by other parts of a structure, of which it was made to form a part, either by riveting or other modes of connection. It was not that the steel did not appear to possess the qualities when tested in the testing machine, but its behavior was apparently different when employed in full size pieces or plates, from that exhibited when tested in small pieces in the machine. This difference indicated that there were differential internal molecular strains in the whole plate, which were eliminated when the same plate was cut into strips. This elimination, it was considered, could not take place in the whole plate on account of the harshness of its material. Annealing was resorted to, but only with partial success, the complex nature of the strains in a plate of the material, even when cooled slowly, being sufficient, when aggravated by extraneous strains, to cause its rupture.

The necessity of imparting to steel plates the toughness characteristic of good wrought iron has thus induced steel manufacturers to devote their attention to the production of steel possessing great ductility. It is on this point that much might be said, because in the search for toughness the advantages which the employment of steel in some structures seemed at one time to promise, are being almost lost sight of. Not only are these advantages likely to be lost, but the great ductility being imparted to soft steels and ingot iron in search for this necessary toughness seems likely to give us a material inferior in some essential qualities to much of the wrought iron hitherto in use. Toughness in plates has not been obtained, but instead thereof great ductility attended with low elastic strength.

It may be premised that the structural value of a metal will be proportionate to the degree in which it combines high ultimate strength with high elastic limit and wide range of elastic and ductile extension, or in proportion to the relation in which it combines toughness with strength. Thus a metal which possesses high ultimate strength and high elastic limit, with small ranges of extension, will not have great structural value, as it will not be capable of withstanding impact strains. Again, a metal possessing high ultimate strength with low elastic limit will have small value for structural purposes, as, though high ultimate strength is an essential property, the limit of elasticity determines in almost all cases the sectional area, and, therefore, weight of metal required for a given duty. A high elastic limit, with considerable elastic extension, must be obtained, combined with great toughness beyond that limit, or, in other words, a high elastic limit must be attended by a considerable range of extension both within and beyond that limit, combined with high ultimate strength.

About a dozen years ago Bessemer metal was offered for bridge and ship construction which in the testing machine showed an ultimate tensile strength of from 34 to 40 tons per square inch; an elastic limit from 20 to 23 tons, and a range of ductile extension of from 10 to 18 per cent., while the tests of plates considered suitable for the shells or barrels of boilers showed figures not much lower than these. The failures which occasionally attend the application of this steel, however, discouraged the extension of its application by engineers, who hoped that greater uniformity in the mechanical properties of the metal would gradually be obtained by the steel makers. A steel of somewhat lower tenacity and greater ductility, attended by great uniformity in composition and behavior, was then produced, and this indicated that steel makers and engineers must look to steel of milder character for the removal of the difficulties which had attended the structural application of cheap steels—that is, steels not produced by the crucible. The result of this was that engineers specifying steel for, say, bridge work, stipulated that it should not possess more than a certain maximum tenacity, a reversal of the stipulation that had always and does obtain with respect to iron. As a further result of this, and to insure that the harder steels of comparatively high tenacity, but less uncertain character, should not be used in the construction of bridges, the Board of Trade regulations upon the subject limited the tensile strain on any part of a structure to 7 tons per square inch. This has led to the endeavor on the part of all steel makers to produce the very mild soft steels now largely used, some of which afford the engineer no help toward producing the lighter structures which a dozen years ago it was promised that steel would give them. Boiler shells must be made nearly or quite as thick as if they were constructed of iron.

As an instance in illustration, reference may be made to the results of a series of experiments made on iron and mild steel, in order to determine their respective values for high-pressure boiler construction, and described by Mr. David Greig and Mr. Max Eyth in a paper read before the Institution of Mechanical Engineers, in June, 1879. Among other experiments, the mechanical properties of mild steel and Yorkshire plates under tensile strain were determined. The plates—both iron and steel—were obtained from Messrs. John Brown & Co. and Messrs. Cammell & Co. In the paper referred to the mean tensile strength, elastic limit and extension are given as follows:

	Ultimate strength. Tons per square inch.	Elastic limit.	Extension per cent.
Iron plates	22.27	16.06	36.2
Steel plates	25.80	16.74	28.3

The extension given is in a length of 6 inches. If all reference to the secondary elastic limit, which may be induced by repeated application of strain up to and slightly exceeding the elastic limit of each preceding test, be omitted, it will be seen that the so-called steels, to which the above figures relate, present scarcely any structural advantage over iron. The elastic limit is nearly the same, and though its ultimate strength is greater than that of iron, its ductility, as shown by its range of extension, renders its greater ultimate strength of little value, for very long before it can be strained to that limit in any structure, it stretches so much that the accumulation of strain is prevented, and this may be shown to take place in bridge as well as boiler structures.

If we turn now to the result of tests, made by Mr. Kirkaldy, of Siemens' mild steel, we find that the mean results for plates of from 0.37 to 0.70 in thickness, annealed and unannealed, are as follows:

	Ultimate strength. Tons per square inch.	Elastic limit.	Extension per cent.
Unannealed	31.02	14.50	23.4
Annealed	28.84	12.84	24.6

From these figures it will be seen that though this material (like that used at Messrs. Fowler's works) may be very safe, it presents little structural advantage over iron plates, the limit of elasticity being low, permanent set taking place at as low as 12.84 tons per square inch when the plates are annealed. It is, however, observable that though the extension of this metal reaches a total of 24.6 per cent. it is less than 11 per cent. annealed, and under 7 per cent. unannealed at a strain of 26.78 tons, thus indicating very considerable toughness, and probably greater value as a structural material than that tested by Messrs. Greig and Max Eyth.

Material described still more recently gives

the engineer even less of hope that the modern steel for structural purposes will enable him to produce lighter structures than he can do with iron. It would even appear that greater hope of obtaining a material of high structural value is to be found in iron, for it was recently stated at a meeting of the Iron and Steel Institute by a member that he had been experimenting with puddled iron, the elastic limit of which ranged from 19 to 21 tons, while its ultimate strength was 29 tons, and its elongation between these strains was 23 per cent. at a length of 8 inches. The elongation within the elastic limit was not mentioned. Unless a higher elastic limit can be obtained no advantage in a structural sense is secured. High ultimate strength is a comparatively useless quality if the elastic limit is low, and great range of extension is also of no service. In bridge work a very high range of extension is useless, because the members under tension would elongate if strained beyond the elastic limit, to a greater extent than the members under compression would compress, and thus the structure would fail by the destruction of the balance in the disposition of the strains on the different parts. Even if the material showed a range of compression equal to its range of extension, this would remain equally true, because, in order to secure the necessary resistance to bending or buckling, members under compression must be of greater sectional area than is indicated by the static strain. Thus a higher elastic limit is the first essential in steel for structural purposes. This, it appears, can only be obtained by making the steel harder, which, by the Bessemer process at least, if not by other largely used processes, it seems cannot be secured without other attendant qualities or properties which make the material difficult to work, and more or less uncertain in its behavior under mechanical treatment. Whether this is really now so, or must continue so, it remains for the steel makers to show, but it does at least seem plain that, even with some of the so-called mild steels, a little misgiving is pardonable on the part of the boiler maker, who wonders what he may find in a boiler shop to-morrow where he has left a nearly or quite finished boiler to-night. Not only, moreover, is this mild steel way of getting over the difficulties attending the use of the strong steels likely to rob engineers of much that the latter material promised, but by the still existing custom of denominating what is really iron by the term steel, we are likely to lose the advantages gained by using the harder steels where that has been possible, for already a good deal of so-called steel, in which there is not much more carbon than there is in a Lowmoor bar, is being worked up into steel rails and steel tires.

It will have been observed that in this paper the attention of the writer has been almost wholly confined to references to plates. This has been done because chiefly in plates improvement has to be looked for from the steel makers. With bar steel, the difficulties in manipulation and connection in structures have not been so great as with plates, and failures, whether due to imposed or internal differential molecular strains, have not been so frequent; sections are less in area and forms less capable of imitating and transmitting destructive strains. Consequently, mild bar steel need not be so ductile as mild plate steel, and hence the structural value of mild bar steel is much higher than that of plates, and engineers can use it to advantage. In the course of a very interesting lecture, delivered by Dr. Siemens at the Royal United Service Institution in March, 1879, he gave a table showing the results of a series of tests of mild and hard steel bars up to and slightly beyond their elastic limit. This table is of great value as affording evidence of the structural value of these bars, and it is to be greatly desired that similar observations should be made on all kinds of modern metallic structural materials. The mild bars to which Dr. Siemens' table refers shows a mean elastic limit of 17.37 tons when annealed, though the same bars showed the lower mean elastic limit of 16.62 before being annealed, and, curiously, the elastic extension is also greater in the annealed bars, the mean extension in bars 5 feet and 4 feet 11 inches being 0.086 inches, the value of the Te of the bars being, by the before-mentioned formulæ, respectively 57.04 and 53.348. Such material, however, is not to be had or cannot be safely used in plates, and even in bars has been very little used in bridge work. Steel makers have yet to satisfy engineers that it can be safely used.

In conclusion, a few words may be said upon the behavior of the harder kinds of steel plates in which they differ from those of iron. It has been observed by many that some of the steel plates with an elastic strength as high as 18 tons per square inch, combined with a ductile extension as high as 15 per cent., as obtained by the tests of strips of such plates, in the hands of plate smiths or when built into structures, behave very differently to iron with the same apparent mechanical properties. The toughness of good iron plates enables them gradually to dissipate any internal differential molecular strains of tension and compression that may be resident in them as they leave rolling mills, by differential compression and tension. Steel plates which are comparatively hard, but which, when torn asunder in test strips, indicate an ultimate extension of as much as 15 per cent., might be expected to do the same. Such, however, is not the case, for the plate has often behaved when built up into a structure as though its ultimate extension was not more than 1 or 2 per cent., an l, like glass, possessed of a high elastic limit but no toughness. Why this should be is not known, but it may be suggested that such being the behavior, the following may afford some clue to the fact that thick plates, at least of such material, have fractured in various directions, after the structure of which they have formed an integral part has been completed. Most plates before being built into a structure are annealed, but the following remarks apply equally whether annealed or not:

Plates, when taken from the rolls or from the annealing oven are generally laid on a flat surface to cool, but whether laid down or stood on edge, cooling takes place somewhat more rapidly toward the corners and edges than at the middle. At first, the whole plate is of the same temperature, which may be that of redness. The exterior parts first assume the rigidity of cold iron, and contraction takes place on the interior parts, which remain at a higher temperature, and therefore the contraction has taken place under a tensile strain. Thus, if a plate of 1 inch in thickness is considered in illustration, it will be seen that a corner of, say 6 inches on either edge, has an area on the two sides of 36 square inches, but it has also the additional effective cooling area of the edges, which adds 12 square inches, making for a surface area of 36 square inches a total of 48 square inches of effective cooling area by radiation and evection. If, on the other hand, an area on the two sides at the center of the plate of 36 square inches of such surface be taken into consideration, it will be seen that the edge surface can only be considered as cooling by conduction. Thus the effective cooling area of the outer parts of the plates is much more efficient than the central parts. These outer parts having, then, become rigid and contracted under tension, exert a corresponding compressive strain upon the interior parts still at a higher temperature, and thus more or less amenable to compression. This tensile strain upon the outer parts or borders of the plate is gradually eliminated as the interior parts cool, and is finally changed into one of compression, as the inner parts contract in cooling under a molecular tensile strain, due to the incapacity of the rigid border to follow the inner parts in their contraction. In the cold plate put into a structure, there is thus initial molecular strain, differentiating from compression at the edges to tension toward the center. If the plate is cooled under circumstances inducing unequal cooling, these internal strains are aggravated, and they may possibly be of such magnitude that extraneous strains that would not materially affect a tough iron plate may be sufficient in a hard steel to cause rupture. Further, when a plate of such a character is being riveted up, every rivet is compressed under a very high strain to make it fill the holes, and thus, acting as a viscous fluid, adds to the strains already tending to destroy the plate.

Fire Protection in Factories.

To the Editor of The Iron Age.—DEAR SIR.—We have read with much interest, in the issue of 14th inst. of your valuable paper, the system of fire inspection recently inaugarated by the Yale Lock Company, and are induced to the belief that if their plan is generally adopted by manufacturers a large percentage of fire losses will be effectually prevented. We have been engaged for the past 40 years in manufacturing, and during that period have experienced several losses by fire, and yet, nevertheless, after careful investigation, have been unable, except in one or two cases, to trace the cause to its true origin. Apart from the above, we have had some half-dozen well-ascertained cases of spontaneous combustion in different departments of our factories, and are convinced that fires will sometimes occur without visible or suspected sources. To illustrate by an incident in point. Last June our president, Mr. J. A. Rumsey, while overseeing a night-gang of workmen making some needed repairs at our factories, between 11 and 12 o'clock p. m., had his attention called by the night watchman then on duty to one of our three paint rooms. Upon entering a blaze was discovered, issuing from the door of a disused store, a yard or more in length. The flame was speedily extinguished, the contents of the store examined, and about a bushel of cast-off garments and rags, saturated with paint and oil, was removed from the iron receptacle. Evidently some among the workmen in the paint room, innocently supposing the stove to be a safe storehouse, had utilized it for such rubbish. From the presumable security of a disjointed stove in summer time, we should probably never have imagined any danger unless discovered in such a manner. Our works are heated by coal stoves of approved construction, and carefully guarded, yet with more than 200 workmen employed in many departments on all kinds of labor, as carried on in our Pump and Fire Engine Works, it would be strange indeed if some débris should not occasionally be disposed of contrary to shop regulations. We presume that there are thousands of mills and factories unprovided with as perfect fire apparatus as our own, as we possess a full equipment of the best fire pumps and hose, both night and day watchmen in constant service, together with first-class overseers, and yet with all our best care and diligence we have not been able to entirely prevent open and less obvious causes of danger from fire. The method of the Yale Lock Co. is altogether the best we have noticed, and we intend to adopt it. While we are always well insured, still we should consider any possible payment by the underwriters but a poor recompense for the damage, delay and drawbacks consequent upon even a partial stoppage of our industries by fire. In this phase of business, as in other unforeseen contingencies, the "ounce of prevention" is worth more than the "pound of cure." Yours truly, RUMSEY & CO.

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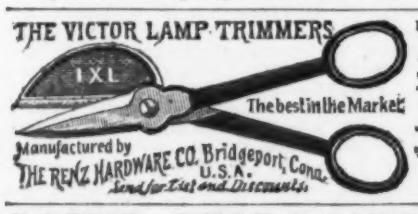

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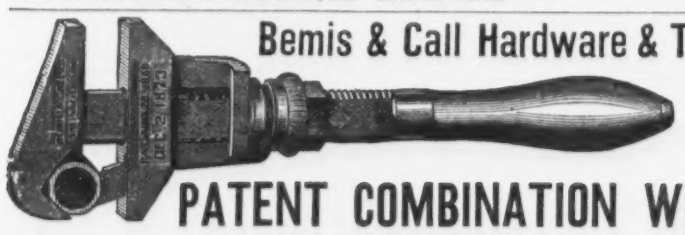

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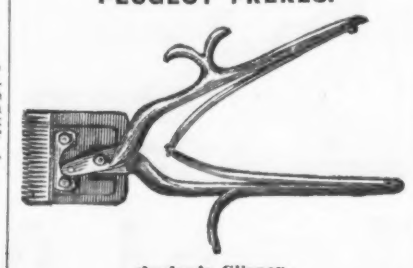

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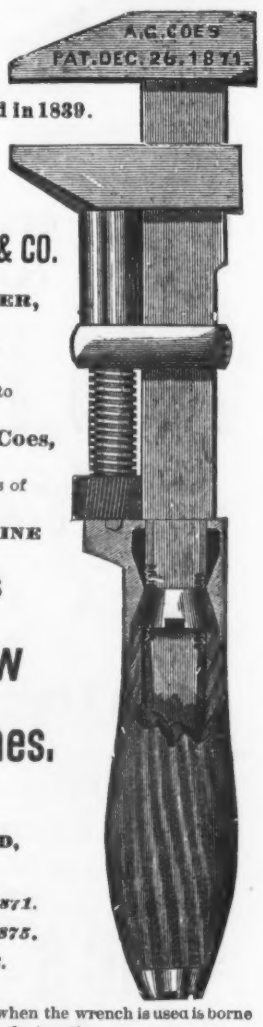

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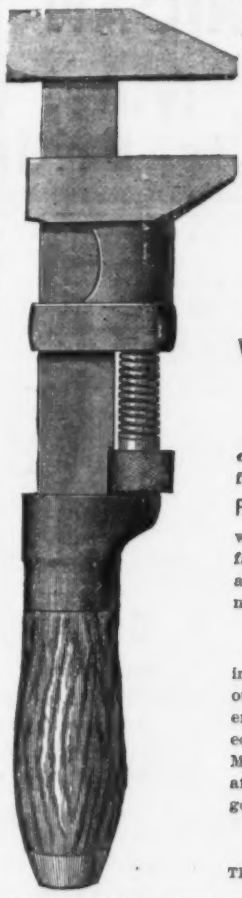

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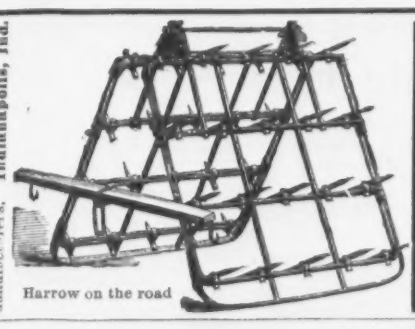

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SCIENTIFIC AND TECHNICAL.

M. Wurtz, the well-known French savant, describes a simple process for

COLORING VEGETABLES GREEN.

It consists in the use of an excess of chlorphyl obtained from spinach, which holds in its cells a large amount of coloring matter. A watery solution of this, rendered alkaline by soda, is added to the boiling vegetable, which is slightly acidulated with hydrochloric acid. The chemical result is common salt and a deposit of coloring matter on the organic tissue. There cannot now be any possible temptation for the unwarrantable dyeing of preserved vegetables by salts of copper or the employment of adulterants for obtaining a vivid coloring.

M. Haureg, a French inventor, proposes a method of

BOARDING RAILWAY CARS WITHOUT STOPPING THE TRAIN.

A "waiting carriage," fitted with a steam engine with special gear, and space for passengers and luggage, is placed on a siding at the station, and picked up by the train as is goes past. The latter, by means of a hook on its last carriage, catches a ring supported on a post, and connected with a cable wound on a drum in the waiting carriage. Thereupon the drum begins to unwind, and in doing so compresses a system of springs, while the carriage is moved at a rate gradually increasing to that of the train. The engine of the carriage then winds in the cable, the train and carriage are connected, passengers are transferred from the joined carriage to the train, and *vice versa*; then the two are disconnected, and the engine of the carriage, working on the wheels, brings it back to the station whence it was taken.

M. Coret has brought out

A METALLIC THERMOMETER

which is chiefly remarkable for the small space which it occupies, and which renders it particularly suitable for those who need pocket instruments which are not subject to accidental breakage. M. Coret solders end to end several concentric tubes of different metals, steel and zinc for example. By alternating the joints the differences of dilatation are added, so that the last tube, being connected with a toothed wheel or series of levers, gives a great motion to a needle, sufficient to indicate small fractions of a degree of temperature. The metals being good conductors, the indications are rapid when the metallic mass is placed in contact with any body of which the temperature is desired. The tubes can be concentrated in a space of less than an inch.

A British Workman on American Manufactures of Files and Saws.

A correspondent of the Sheffield *Telegraph*, who styles himself "A Sheffield Workman," writes as follows:

I had recently a treat of no ordinary character in looking over the branch establishment of Messrs. H. Disston & Sons, the eminent manufacturer of saws, files, &c., at Tacony. In the file-making department—with the exception of a few file cutters—all is done by power and machinery, from the forging of the smallest saw files to those of the large kinds. The speed with which the former steam hammers travel requires the greatest dexterity on the part of the workmen to turn the blank in its die. In the latter the saving of physical exertion is immense in forging large files. The file grinding machines are equally economical; the same may be said of the 50 or more of file-cutting machines. In the saw-handle-making section of these works the mechanical contrivances are of the most perfect kind. The use of files, rasps and floats are superseded by other tools, astonishing in their adaptability for perfect and rapid production. No written description could convey an idea of their great utility and method. In a case where wood-cutting frames are made, and also cross-cut handles, the pieces of timber in their accurate lengths are placed in machines, and almost entirely automatically they come out finished articles. The skill of the engineer has taken the place of the skilled artisan, for mere boys are tending these operations, and yet quality is not ignored. The best workmen to be had are got to superintend and be held responsible for a department, and several Sheffield hands I shook were thus employed, accompanied with inquiries of "Old Folks at Home." Great care is taken for the health of the workman. There are good light, lofty, airy shops, with apparatus for carrying off the dust imperative in such an occupation, some of the men wearing respirators to keep it from their lungs. The readiness of the firm to adopt any practical suggestion from any one of their hands is a notable feature in most American factories, whereas the cold shoulder is generally given to such in England. We weakly waddle in the wake of America in the matter of inventions until a necessity is proved, when an earnest effort is made and progress is attained. Old-fashioned methods of manufactures will have to be abandoned for newer and better ones if "Mene, mene, tekel, upharsin," is not to be written across British commerce in the future. The individual skill and handicraft of the best Sheffield workman I have not seen surpassed in the United States, but they are inadequate for all the requirements of the present age. I have previously spoken of the "white elephant" as exhibited by certain manufacturers. I am sorry to say that this is not confined to them, but often extends to the workmen. The difficulty to obtain work, even when there is plenty, is greater than would at first seem probable, and herein is shown the selfishness of the American character in the main. I know a case where an English workman applied for work and got promise of employment. The work to be done and the rate of wages to be paid were agreed upon, but when he went to work next morning he was told that there must have been a misunderstanding; they could not find him anything. It subsequently transpired that the men had learned of the Britisher's engagement, they held a conference, and offered to work overtime rather than have a stranger admitted to work with them. A subsequent offer of a menial character was made to him and refused. It is impolitic for such to force themselves into a factory with an opposing faction against them, for they will be most certainly dropped—west of the Allegheny mountains—if they persist in doing so.

The Pullman Car Patents.

The Baltimore and Ohio Railroad Company has filed its answer, at Baltimore, to the suit of the Pullman Palace Car Company, of Chicago, for an injunction to prevent the introduction of palace cars on the Baltimore and Ohio Railroad similar in construction to those of the Pullman Company. The suit of the Palace Car Company was entered four weeks ago, the Baltimore and Ohio having ended its contract on October 1, and having begun the building of cars for itself at Cincinnati. The answer of the Baltimore and Ohio claims that the Pullman patents are invalid, many of them having been anticipated by other inventors; that many of the claimed inventions are found in cars used long prior to the Pullman patents; and that the reissue which Pullman took out in 1875 was for a different invention from that of his original patent. The Baltimore and Ohio Company claim that Pullman has repeatedly, on the ground of defective specifications in previous patents, had new ones issued, and in this way has extended his original device into a much larger claim. In 1876, Pullman filed a bill against the Barney & Smith Manufacturing Company, of Cincinnati, to restrain their manufacture of cars, which he claimed infringed his patent. This is the company manufacturing cars for the Baltimore and Ohio, and which has also manufactured cars for the Central Pacific, Chicago, Milwaukee and St. Paul and other railroad companies, as well as for the Wagner Sleeping Car Company. Testimony has been taken in this case at Cincinnati, but no injunction has ever been obtained. Similar suits were brought against the Wagner Company in Chicago and New York with similar results. The defendants also claim that the Michigan Central, Chicago, Rock Island and Pacific, Chicago, Milwaukee and St. Paul, Central Pacific and other roads, are using cars similar to those manufactured for the Baltimore and Ohio, and that the Pullman Company has never sought to restrain them; also, that all of Pullman's 30 patents have expired, except one, and that has only two years to run. The Pullman Company's counsel, which includes Messrs. Dickerson, of New York; Thunlor, of Rhode Island; Offield, of Chicago, and Steele, Carter & Sterling, of Baltimore, asked the court for an order to restrain the Baltimore and Ohio from using the cars, pending the hearing of the case. This the court refused to grant, and the Baltimore and Ohio will put on its cars Nov. 1. The hearing in the case has been postponed until November.

French Coal and Iron Statistics.

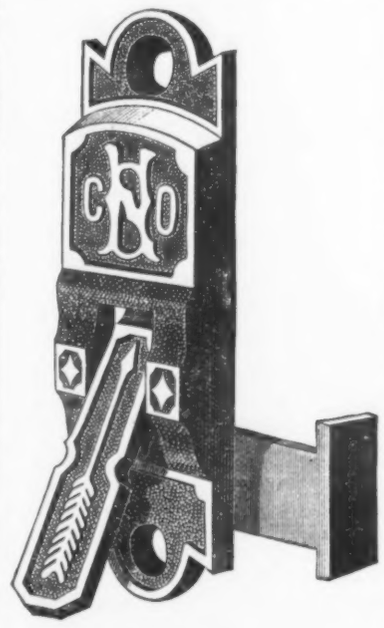
The *Bulletin des Travaux Publics* publishes in its last number tables of the mineral production of France during the first half of the current year. Of mineral fuel there have been raised 9,398,000 tons, being 9,120,400 tons of coal and anthracite, and 277,600 tons of lignite. The total production during the last six months of 1879 was 8,773,000 tons The departments of Pas de Calais, Nord, Loire, and Gard give the largest results, the quantity raised having been 2,203,400, 1,778,600, 1,774,600, and 1,013,200 tons respectively. Lignite was raised in eighteen departments, the principal production having been in the Bouches du-Rhône, where 229,700 tons were raised. There are 46 coal basins recorded, of which the Valenciennes, extending through the Nord and Pas de Calais, is the most important, it having yielded 3,935,000 tons. The basins of Loire and Alais came next, one having yielded 1,772,000, and the other 1,007,000 tons; none of the others, except the Creusôt and Blanzy basin, from which 565,000 tons were extracted, have yielded 500,000 tons during the six months. The largest lignite basin is that of Aix (Bouches-du-Rhône and Var), whence 230,000 tons were extracted during the six months. The production of cast iron between January and June was 847,335 tons, 709,079 tons of which was pig for refining, and 138,256 tons for castings. This shows a considerable increase over the previous six months, when the total production was 687,187 tons. The departments of Meurthe and Moselle heads the list with 260,226 tons, followed by the Nord with 109,322 tons: the department of Charente produced the smallest quantity, 65 tons of charcoal pig. The steel production during the same period was in all 183,173 tons, an increase of 13,205 tons over the previous half year. By far the greater portion of this was for rails—135,827 tons; 38,021 tons were for merchant sections and 9325 tons for plates. About 160,000 tons were manufactured by the Bessemer or the Siemens-Martin process. Of wrought iron the total output was 487,320 tons, against 446,435 tons the previous half year, 23,634 tons of rail were manufactured, 381,044 tons of merchant bars, and 82,642 tons of plates.

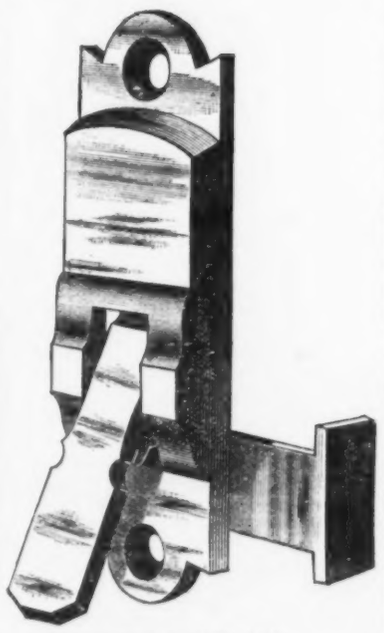
The *Iron Trade Circular* has published a table giving the statistics of the blast furnaces in the United Kingdom on the 30th of September, 1880. Out of 955 furnaces, 554 were in blast, a decrease of 5 since the 30th of June last. The following table shows how they stand, in detail:

	Furnaces— Built.	In Blast.
England:		
Cumberland	52	40
Derbyshire	57	42
Durham	99	85
Gloucestershire	9	2
Hampshire	2	0
Lincolnshire	18	13
Lancashire	51	33
Northamptonshire	25	10
Northumberland	4	4
South Staffordshire	146	45
North Staffordshire	37	20
Somersetshire	1	1
Shropshire	25	11
Wiltshire	7	3
Yorkshire, West Riding	46	22
Yorkshire, North Riding	101	89
Total	363	329
Wales:		
North	10	7
South	154	73
Scotland	150	95
Total	327	93

The Universal Sash Lock.

We show in the accompanying cuts two styles of sash fasteners made by the Universal Sash Lock Company, of Albany, N. Y. They are the invention of Mr. L. C. Strong, of that company, and are designed for use on the windows of dwellings and railroad cars. It is claimed for the Universal Sash Lock that it has several important advantages over devices hitherto introduced for holding a sash in any desired position. Primarily it is a secure fastening, and will hold a window locked until the sash is broken. It prevents any rattling of the





UNIVERSAL SASH LOCK.

sash by wind, or in the case of cars, by the jar of running. It secures and holds the window firmly in every position without disfiguring casings or sash. It is strong and durable, having no springs or other parts liable to derangement, and cannot be injured until it is destroyed; it is operated with ease. It is, in fact, a very simple and complete device, and one which will probably prove satisfactory in every position for which it is intended or adapted.

The Raising of the Obelisk.

The obelisk is now nearly up to the corner of Ninety-sixth street and the West Boulevard, and after two more pulls it will be in position for turning. Moving it up the hill has been a very tedious and trying work, not so much on account of steep ascent as owing to the inequality of the grade of the street, which necessitated the use of heavy timber blocking under the track in order to maintain a uniform grade from the dock to the top of the hill. The blocking has varied from 6 inches to 12 feet in hight in different parts of the hill. Since the steep ascent began, the distance the obelisk has been moved has averaged 80 feet every 24 hours; the actual time occupied in moving it at each pull has never exceeded half an hour, which includes an interval of 20 minutes consumed in shifting the roller boxes from the rear to the fore end of the cradle on which the monolith and the pulling engine rest. The remaining 23½ hours are taken up in grading the street transversely, moving up and placing the heavy timbers for the foundation, and building up on top of these a crib-work for the track. The greatest care is necessary in laying the track in order to preserve a uniform bearing of the stone on the cradle, otherwise there would be risk of its breaking and great difficulty in moving it on account of the concentrated weight over a small area. As soon as the upper end of the stone reaches the boulevard the lower end will be lifted a few inches with the hydraulic jacks until it corresponds with the next grade on the boulevard, which is less than one half that of Ninty-sixth street, which is 9.17 of an inch to the foot. When the new grade has been established the monolith, with its cradle and the track, will be swung around together through an angle of 90 degrees, by placing strips of iron under the fore end of the track and pivoting the after end on the hydraulic jacks. This work has been done several times, and the method employed has been found to work admirably. The work of turning the obelisk will probably occupy two days. Once pointed down the boulevard the progress will be much more rapid than heretofore, as there will be no need of heavy blocking nor of transverse grading. It is possible that as much as 500 or 600 feet per day, and half this distance at night, may be covered by the stone while it is on the boulevard on which there is an ascending and descending grade. Down the latter, what is now the pulling purchase will have to be applied to the rear to hold the obelisk back and keep control of its movement. Another turn of 90 degrees and change of grade will be made when it reaches the corner of Eighty-sixth street, which has a very slight ascent to the west entrance of of the transverse road. Through this road there will be several changes of grade and turns through small angles; the road, though intended for ordinary street traffic, forms a series of curves which may be picturesque and will be annoying. On reaching the Fifth avenue entrance to the transverse road a turn of 90 degrees will be necessary, and again on reaching the Eighty-second street entrance to the Park, where the obelisk will be moved up to the trestle-work now in course of construction, on which it must traverse the short distance it has to be moved through the Park in order not to obstruct the paths and drives. This trestle comprises eighty bents resting on timber-blocking, to distribute the weight over a large area and insure an equal bearing when the stone passes over. The bents vary in height from 5 to 45 feet, and already sixteen of them have been erected; the timbers for nearly all of the others are fitted, ready for blocking together. The same chain cable and purchase and engine now in use for moving the obelisk will be used for pulling it over the trestle up to the pedestal. The distance from the landing stage to the site in the Park over the route to be traversed by the obelisk is about 9000 feet. In the Park equally important work is in progress. Masons are constructing two temporary piers—one one each side of the pedestal—on which the steel structure for erecting the obelisk is to stand. One of the piers is now ready for the timber beds of the steel structure, and the other will be ready during this week. In the meantime there are gangs of machinists, blacksmiths, carpenters and riggers preparing the steel beams and braces for their places, and fitting the several pieces ready for bolting together as soon as they are in position.

Only those who are interested in the work or have followed it closely can form an estimate of its magnitude and costliness. There are now employed about 70 mechanics and laborers in seven separate gangs, each requiring constant attention.

The worst of the defective places in the steps on which the pedestal rests, the result of hoary age, have been carefully cut out and replaced by similar pieces of stone brought from Egypt expressly for the purpose. These patches have been so carefully fitted that it will be difficult to tell where the pieces are let in. While the obelisk must always be the center of attraction for the casual visitor as well as the student, the pedestal and its steps cannot fail to awake in us strange feelings and thoughts. How many generations of how many different races have trod on the very steps where we may now tread during the 3600 years they have served as an approach to one of the world's greatest curiosities! Sages and prophets, saints and heroes of all nations have visited Egypt during this time, and necessarily have examined this obelisk, one of Egypt's greatest and most accessible monuments. In this association lies the inestimable value of the obelisk to Americans; it is a tangible link between the absorbing present and the interesting past—between the civilization of to-day and the comparatively higher civilization of a period almost at the very threshold of history.

At a meeting of the incorporators and subscribers of the Iron Steamboat Company, held at Long Branch, the organization of the company was completed by the election of the following directors: John Roach, of the Morgan Iron Works, New York and Chester, Pa.; Joseph C. Ferguson Philadelphia; Samuel Carpenter, Eastern Passenger Agent of the Pennsylvania Railroad; James B. Houston, President of the Pacific Mail Steamship Company; Alfred R. Whitney, iron merchant, New York; Charles H. Cramp, shipbuilder, Philadelphia; Nathan G. Miller, Bridgeport, Conn.; Lewis May, of May & King, bankers, New York; R. Cornell White; Henry Havemeyer, of Havemeyer & Eastwick, sugar merchants, and the following members of the New York Stock Exchange: Geo. S. Scott, of Scott & Leavitt; Washington E. Connor; James D. Smith, of Jameson, Smith & Cutting; Rufus Hatch; Charles E. Quincey, of William Heath & Co.; William J. Hutchinson, of Kennedy, Hutchinson & Co.; and Charles J. Osborn, of C. J. Osborn & Co. The Board of Directors organized by electing George S. Scott president, Rufus Hatch, vice-president, Lewis May, treasurer, and William M. Earl, secretary. The Executive Committee is composed as follows: James B. Houston, W. E. Connor, James D. Smith, C. J. Osborn and Lewis May. Specifications for twelve of the non combustible and non-sinkable boats that the company propose to build have been completed, and the contracts for the same will be awarded this week. A sum of money sufficient for the present uses of the company has been pledged, and the subscription books for the remainder of the stock will be opened in a few days in this city. The capital of the company is $10,000,000.

Mr. William Harris, of St Louis, has made some modifications in the construction of three-high sheet rolling mills which enable the rolling of sheets of No. 26 gauge, while in the ordinary mill No. 18 is generally the lightest which can be successfully turned out. The three rolls are placed one above the other, the top and bottom roll being smaller than the center roll. The center roll under the Harris patent is hollow, and a continuous stream of cool water passes through it, so that while doing twice the work of either of the others, it remains at a uniform temperature and prevents any expansion, the baneful effects of which any manufacturer understands in the breaking of rolls, buckling of sheets, delay in stopping to cool down, &c. This mill, which is being introduced by Mr. J. M. Ayer, of Chicago, Ill., is in operation at the works of the St. Louis Stamping Co. of which the inventor is superintendent.

The Iron Age

AND

Metallurgical Review.

New York, Thursday, October 28, 1880.

DAVID WILLIAMS - - *Publisher and Proprietor.*
JAMES C. BAYLES - - - *Editor.*
JOHN S. KING - - - - - *Business Manager.*

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CONTENTS.

The railroads of this country continue to prosper, their earnings being considerably ahead of those received during a corresponding period for the last few years. The fact that this improvement is not confined to some leading lines of travel, nor to those of a few favored sections, but extends to all with hardly an exception, and is true for those of the East as well as those of the West, speaks eloquently for the sound condition of internal commerce. As the outlay for maintenance and running expenses has generally remained stationary, and even, in some cases, has undergone a reduction, it is safe to say that the larger portion of this increased income is available for the payment of dividends, for the reduction of debts and for the improvement of rolling stock and permanent way. It is only too natural that the eagerness to extend their territory or secure that already held against embarrassments, has led to that excessive competition so aptly called a war. But the rapid settlement of such disastrous disputes has, until now, promptly removed that source of danger. To many of the existing roads, however, the present situation contains some elements of peril, among which the greatest is the low cost at which new lines can be built and the cheap rate at which an abundance of capital can be secured. Handicapped by excessive debts incurred during a period of extravagance, loose management and high cost of materials and supplies, these roads are forced to devote a large percentage of their excess of earnings over running expenditures to the payment of interest and the accumulation of sinking funds. They are, therefore, unable to compete successfully with more modern roads, who earn fair returns upon the capital invested before their older rivals are prepared to announce dividends. There seems now to be a disposition on the part of many capitalists to take advantage of this state of affairs. This course, though it tends to destroy forever the fatal effects of a period of inflation and to prevent the maintenance of exorbitant freights, is not, on the whole, likely to serve best the interests of the country at large. There are so many fields of enterprise which are only awaiting the advent of capital in order to add materially to the industry and prosperity of the country, that it appears a pity that efforts should be directed to a direct competition with existing enterprises.

The Charcoal Iron Interest.

The letter of our correspondent, printed on another page of this issue, gives a very full account of the sessions and excursions of the National Association of Charcoal Iron Workers, at its first annual meeting in Harrisburg. We judge from the account that the meeting was pleasant and profitable. There is much in and about Harrisburg to interest those engaged in this branch of the iron trade, and the days and evenings of the association, during its four days' meeting, seem to have been well employed.

It is time that the charcoal iron trade had such an association as this. The wave of progress, which has been felt so sensibly in the coke and anthracite iron trades, has swept by the charcoal furnaces and left them following the primitive and wasteful methods of the last century. There are comparatively few charcoal furnaces in the country at which evidences may not be seen of an adherence to primitive processes and appliances which have no other excuse than that they have always been employed. In their expressions of opinion on most subjects connected with their business, we find that charcoal ironmasters are, as the rule, prejudiced in favor of old methods, in spite of the fact that it is possible to produce equally good results much more cheaply. Many of them seem to think that there is in charcoal some mysterious property which improves the quality of iron, and not that its value as a metallurgical fuel is due simply to a purity which renders it incapable of imparting any deleterious elements to the metal. We find a strong tendency to adhere to rude and wasteful processes in wood carbonization, when better results, with important economies in the preservation and utilization of the by-products, can be attained with improved kilns. They know they can make good iron in the old way; but they do not seem to realize that progress in scientific metallurgy does not imply the sacrifice of quality, and that charcoal iron, like everything else, can only hold its place in the world's markets when in the processes of its manufacture the economies of production are intelligently studied and practiced.

There are reasons for this conservatism in the charcoal iron trade which it is not difficult to discover. Hitherto it has been considered necessary that charcoal iron making should follow the receding line of our forests, and hence our charcoal iron works are found on the outskirts of our widening areas of iron production. This has led to a wide separation of the charcoal iron works, and has placed serious difficulties in the way of that interchange of ideas and experiences between those engaged in the industry which is so fruitful of benefit. There has been but a limited and unsatisfactory literature of this branch of metallurgy, and nothing to call out investigation and experiment. From comparative isolation, charcoal iron makers have learned to place a false estimate of value upon knowledge gained by experience, and this has made them secretive and disinclined to tell what they know, or to record, for the benefit of others, the scraps of knowledge they have gained. The result has been a very limited progress, and a clinging to old methods, because no better methods were known. In the organization of a National Association representing this branch of iron making, we see the promise of a change which shall give a great impetus to progress in charcoal iron making. It will aid materially in creating a literature of charcoal burning and charcoal iron making, in scientific forestry and forge practice, which in a few years cannot fail to have a marked effect. The information thus gathered will open the eyes of many in this trade to the wastefulness of present methods, and set them first to thinking and then to experimenting. Perhaps it may even lead to a great development in this branch of iron making. Already the question is raised whether the planting of charcoal furnaces in the forest is not a mistake, and whether the best locations would not be found on the seaboard. To a charcoal furnace with tidewater wharves, suitable wood for carbonization could be brought from whatever source obtainable. The forests of Maine and of the South Atlantic States could be drawn upon with equal facility, and cheap rates of water transportation would make such a supply less costly than one cut from year to year on great tracts of forest land, owned and maintained at the cost of the inland furnaces. The wood could be converted into charcoal in kilns as well on the seashore as in the mountains, and the manager of the seaboard furnace could obtain his ores as well from abroad as at home. With this advantage he could make an unequalled quality of iron and have a market for it close at hand. This question of making charcoal iron at the seaboard has already been raised in Sweden and Norway, and is there attracting much attention. Here even more favorable opportunities for such a development of the industry are offered, and the idea has already taken a strong hold upon the minds of some of those who may be looked upon as leaders in this branch of the iron business.

A Half Century of Railroading.

The jubilee of English railroads, and, consequently, of the railroads of the world, has just been entered upon. Fifty years ago, the 15th of September, the first locomotive left Liverpool for Manchester, England, and on that day the road between these two points was formally opened.

The history of the struggles connected with the chartering and building of this road are so well known that it is needless to repeat them. It is interesting, however, to note that many of the arguments advanced and the fears expressed 50 years ago reappear at this day with remarkable frequency, and are argued with as much pertinacity as though they were new discoveries. For example, one of the chief arguments used before Parliament against the granting of the charter was the canal argument, that has but just ceased to be potent in the James River Valley of Virginia. The argument was that the road must not be built because there were three lines of canal between Manchester and Liverpool, and the road would injure their traffic. To guard against consolidation and a concentration of power in individual hands, the charter provided that no person should hold in his own right more than ten shares of the capital stock, and that the dividends should be limited to 10 per cent. The intense noise, it was argued, would destroy all peace of mind, the air would be vitiated, the birds killed, cows would cease to give milk, farm produce would be unmarketable, and the race of horses would die out. In these matters Parliament seems to have "taken the chances."

The first freight train over the new road from Liverpool to Manchester started December 4, 1830, and consisted of 18 cars loaded with 200 barrels of flour, 135 bales of cotton and other freight, aggregating over 50 tons. The passenger traffic amounted to over 800 persons daily the first week, and exceeded 1000 daily the second week. As showing the growth of this traffic, the capital now invested in British railways is £720,000,000. There are over 18,000 miles of road built, over which are carried annually between five and six hundred millions of passengers and from two hundred to two hundred and twenty millions of tons of freight.

It is only in America that this showing has been outstripped in any respect. Here the railroad in many cases precedes and supersedes the public road, especially in our new territories, giving us a mileage far exceeding that of any other nation and very nearly equal to the total mileage of all the railroads of Europe, as will be seen from the following table, showing the number of miles in operation at the beginning of each of several decades:

TOTAL MILES IN OPERATION.

	1840.	1850.	1860.	1870.	1880.
Europe.....	2,928	14,932	32,248	65,466	102,700
United States.	3,319	8,589	30,953	54,535	88,000

The capital invested in these 190,000 miles of road is roughly estimated at $20,000,000,000, of which some three-fourths is in Europe and one fourth in the United States. In other words, with nearly one-half of the mileage, our cost is only one-fourth of the total.

Employers and Workmen in Politics.

We are in receipt of a great many circulars issued by the proprietors of iron works and manufactories and addressed to the men in their employ, which are in the nature of personal appeals calculated to influence the votes of those addressed. We can understand why, in a time of great political excitement, the manufacturers feel a deep interest in the issue of the election, but we are by no means sure, considering to whom they are addressed, that these circulars can be considered the proper kind of documents to emanate from the offices of manufacturing establishments. They place the men who may hold different political views from those which such circulars inculcate in an attitude of hostility to their employers. To decline to recognize their right to influence his political opinions would prejudice a workman's standing and embarrass his future relations with those for whom he works. Generally speaking, these circulars contain nothing specifically objectionable. They make no threats and prescribe no conditions; but in many cases the men have reason to believe that, if they read between the lines, they will find there an intimation that the man who receives such a declaration of the views and wishes of his employers, will find it to his interest to vote as they direct. Sometimes this is plainly stated, and men who persist in adhering to the party which the manufacturers of the country are not, as the rule, supporting, are discharged, or their names are placed on the list of those who will be first dispensed with when an opportunity offers which will rob their dismissal of any political significance. Whenever such a course is pursued in a way that makes it savor of intimidation, however slightly, it is wrong in every way. The manufacturer has the right which belongs to every citizen, to think and vote as he likes. He should recognize and respect this right in the case of his workmen. He may throw into the scale whatever of social or personal influence he possesses; but in his relations with the men in some measure depending upon him, he should carefully avoid even the appearance of "bulldozing." In too many instances which have come to our notice, the attitude of the manufacturer is much like that of the captain in the Mexican war who was directed to lead a forlorn hope of volunteers on a desperate mission. He selected his own company for the service, and called them out for a conference. Explaining the delicate and dangerous character of his errand, he said he had no desire to take any one with him who did not want to go. "Consequently," he added, cocking his pistol, "any man who don't "want to go may step three paces to the front, "but I'll shoot the first man who steps out."

We have no desire to underrate the importance of the issues of the impending election; but is it not just possible that they are sometimes exaggerated? On the other hand, is it not certain that they are frequently misrepresented? The workingman knows, perhaps, that the question of wages is one which gives him an immediate and practical interest in supporting the tariff; but he is likely to suspect that the employer has other and better reasons for his interest therein than this argument accounts for. We think it in every way better and more proper that such political manifestoes as those to which we call attention should emanate from the workingmen themselves, and that manufacturers, as such, should not assume responsibility for them. It is well to remember that even moral influence can be carried to a point where it becomes intimidation, and that when the rights of free speech and a free ballot are sacrificed, citizenship will be valueless and the republic a failure.

The Question of Liability in Steam Boiler Insurance.

Elsewhere in this issue we note the decision reached in the suit of Mrs. Henrietta Deitel vs. the Hartford Steam Boiler Inspection and Insurance Company, by the verdict of the jury giving the plaintiff a verdict of $9360 damages for the death of her husband, caused by the explosion of a boiler insured by the company. We doubt if this verdict will stand the test of scrutiny in the higher courts, should it be appealed. To our mind it is absurd to hold the company responsible in damages for deaths caused by the explosion of boilers on which they have written policies. They do not insure a boiler against explosion, but simply agree to compensate the owner in a certain amount for his losses should the boiler explode. Their inspection is simply for their own protection. When satisfied that the risk is a safe one they take it. Fire insurance companies do just this. They inspect buildings on which they are asked to write policies, and if satisfied that the risk is not greater than the premium will pay for, they insure the building. We have never heard of any attempt to hold the fire insurance companies responsible in damages for the loss of life which may result from fires in buildings they insure. In the case of the Hartford Company, the question of liability seems to hinge on the nature of the certificate given by them that the boiler could safely carry a pressure of 80 pounds to the inch. We should not be disposed to consider this a legal guaranty that the boiler would carry that amount, but only a certificate authorizing the owner to carry 80 pounds pressure in his boiler without vitiating his insurance. The question of negligence on the part of the inspector is one between him and the company. If he made an imperfect inspection and failed to comply with the company's rules, the fact would furnish good grounds for his dismissal, and perhaps for civil or even criminal suits against the inspector. The principle in law that an employer becomes responsible for the acts of his servants, seems to us to apply in this case only to the payment of the compensation agreed upon in the policy. The company could not plead that, owing to insufficient inspection, they had been induced to insure an unsafe boiler, and that the policy was null and void because their rules had not been complied with. But having paid the claim of the boiler owner on his policy, we fail to see that they are in any way further liable. They did not undertake to insure life, they were not paid for anything beyond insuring the boiler, and there was no agreement or business relation of any kind between the company and the man killed. This seems to us a reasonable view of the case, and we believe it is the one which will be held by the higher courts. If not, there will have to be a radical change, not only in boiler insurance, but in fire and marine underwriting, as the principles which apply to one apply equally to the others.

The excitement in the French steel rail trade continues without abatement. The persistence of the Creusot Works in taking contracts at startling figures has caused a good deal of speculation and comment. It was quite generally understood that the proposed establishment of works in the East of France to work Minette pig by the basic process was the reason for the cutting of prices. An anonymous correspondent of the *Bourse Lyonnaise*, who is suspected of being an officer of the Creusot Company, asserts that that company can make Bessemer steel rails for 147.5 francs ($28.47 per ton), while those manufactured by the basic process would cost only 107.5 francs ($20.75 per metric ton). The publication of these figures has brought out M. F. Laur, a well-known engineer, who protests violently against them as wrong and as being likely to seriously injure the trade. He goes to the length of printing quite detailed figures, which appear to rest upon a close knowledge of the industry. He makes the cost of manufacturing steel rails at Creusot, by the ordinary process, 187.5 francs ($36.19); at Denain, by the ordinary process, 161 francs ($31.07), and in the East of France, in the future Moselle district, by the basic process, 143.5 francs ($28.07). The weight of authority is with the latter figures. Both accounts, however, agree in one important point—they concede a considerable reduction of cost, due to the introduction of the basic process into a district which, above most others in the world, is particularly well adapted to enter into competition with neighboring regions as soon as the phosphorus question is definitely settled in its favor.

Free Competition vs. Pools.

One of the ablest of English political economists, in a recent article in one of the new reviews, stated as a fact that the tendency of trade at the present time was in the direction of doing away with a free competition as the means of regulating prices for commodities and services, and substituting the principle of combination. It is one of the most interesting studies in connection with industry to watch the development of this tendency, which is far more general than is believed and one that has not, as a rule, received that consideration that its importance demands.

The theory of many political economists has been that free competition was the basis upon which prices for services and commodities were determined. "You cannot pre- "vent the action of the law of supply and "demand," has been the dictum that has been hurled at all economical sceptics who have not believed in the gospel according to Adam Smith, and with a self-sufficient belief in their own righteousness, the orthodox according to Adam Smith have fulminated the major bull of excommunication against all heretics. But somehow these heretics have prospered. Though cursed in basket and store, the basket has not grown empty and the store has increased to abundance that has overflowed in food and clothing to the whole world of hungry and naked.

Of course the sinners, above all others, have been the United States. One economical heresy has followed another during many years of our industrial and commercial life, until it is well-nigh impossible to tell what of Adam Smith we do believe. So great have been our sins that our good friends over the water, who have preached repentance to us so long without effect, are looking on in awe, waiting to see our commercial and industrial Sodom and Gomorrah destroyed by fire.

The chief heresy is protection—an interference with the law of free competition—but one that the whole country seems well-nigh ready to accept. Certainly a Presidential campaign is being run on the heresy—the first one since Polk was elected, early in the forties. We have so often argued the effect of this heresy that we need not enlarge on this point.

Another of these interferences with this law of free competition is found in the pools and consolidations of railroads that are so frequent with us. Of the benefits of these pools, at least in this country, no one has any doubt who has given the subject careful attention, unless that person be a mere doctrinaire or has some special advantage that has been curtailed by these pools. The *United States Economist*, in a recent article, frankly owns the great benefits that travelers and transporters have derived from the combination of railway interests and the consolidation of connecting roads into trunk lines. There is not to-day an objector to these pools and consolidations who would return to the old ways of a score of years ago, when every 25 or 50 miles of track was a new road, under new management. These combinations and consolidations have largely reduced the cost of passenger travel and freight shipment, and the future improvements in this direction will be immensely facilitated by combinations in progress.

Another interference with this principle is found in the societies and organizations intended to maintain fair rates for merchandise and manufactures, like those in the nail, iron, cutlery, screw, hardware and other trades. There is every reason in fact and experience why such organizations are beneficial; it is only in theory that they can be shown to be harmful, and then the facts do not bear out the theory. The most that they do is to give stability to values, and measurably restrain those wide fluctuations which, without permanently benefiting consumers, are so demoralizing and even destructive to the interests of producers.

Not long since a number of gentlemen gathered at Berlin to discuss the outlook of Germany, so far as business and commerce

are concerned. The feeling was naturally a gloomy one, the country being far from enjoying prosperity, and a diligent search was made for any facts which might be interpreted as assuring brighter prospects for the future. To what straits they were driven may be inferred from the following line of argument, which was apparently received with much satisfaction: "The Americans "are sending us much grain, because they "can raise it cheaper upon the virgin lands "of the Western States. They are, however, systematically robbing those lands, "and as one section is exhausted they turn "to the next, repeating a process which "yields enormous returns for the present. The lands available for this method "are steadily and rapidly diminishing "in area, and soon the American farmer "will find himself forced to restore the "virgin fertility by expensive methods "which, nevertheless, will not admit the "approach to the first yields. It is then "that the terrors of the present abnormal "competition will cease, and the German "'*Bauer*' will again conquer his old markets." That there is a grain of truth in all this it is impossible to deny, but we fear that in view of the extent of our public domain, and the constant development in the older agricultural districts, there is very little hope for our German and English friends in the present generation. It should not be forgotten that a steady stream follows the tide of pioneers who till the virgin lands, and that the land brought under cultivation continues to pour forth its treasures of produce under many advantageous circumstances, while those who first skim the soil have to battle against many adversities and drawbacks.

The National Association of Charcoal Iron Workers.

HARRISBURG, PA., October 23, 1880.

The annual meeting of the National Association of Charcoal Iron Workers, which has just closed its four days' session, has been in every way a gratifying success. The energetic secretary, Mr. John Birkinbine, with the co-operation of the ironmasters and business men of Harrisburg and vicinity, arranged a most attractive programme, and by constant watchfulness and good management this programme was carried out in every detail "on time," with no accidents nor disappointments of any kind. It is needless to say that such management adds very greatly to the enjoyment of those who attend a meeting of this character, and that it is not always, if often, that a week of meetings and excursions passes without a delay or a single mishap of any sort.

In the letter published in our last issue, we noted the happenings up to the close of the first meeting, Tuesday evening, October 19. At this point we resume our narrative.

Early Wednesday morning the company met at the depot of the Pennsylvania Railroad, and took cars for the fine property of the South Mountain Mining and Iron Company, which was reached about 10 o'clock. This is certainly a very interesting point, and there is a great deal more to be seen here than could be seen during the few hours which were given to it. The real estate of the company comprises a wooded tract of 22,000 acres on the South Mountain. The improvements comprise a charcoal furnace 42 feet high and 9 feet 6 inches at the boshes, with bell and hopper and closed front. It is blown with three tuyeres. There is also a forge with six fires and a run-out fire. Four ore banks are opened, of which only one was visited, but this one was of much interest. It has been worked for over a century, and progress of the working only seems to develop an increased wealth of ore, which is mined with but little more difficulty than attends the excavation of a clay bank. As an outlet for its ores and iron, the company own and operate a railroad to Carlisle 18 miles long. Everything about the works seems to be in excellent shape. The furnace is blown with Weimer's Centennial engine—5 feet diameter of blowing cylinder and 2 feet stroke. The production is about 100 tons per week of iron for forge purposes only, and the blooms are chiefly used in the manufacture of boiler plate. The company have a beautiful pleasure ground, known as Pine Grove Park, comprising 35 acres. Here we find many charming improvements in the way of artificial springs, rustic buildings, dancing floors, &c., for the accomodation of public parties from the neighboring towns, and in the summer Pine Grove Park is a favorite place of resort.

The geology of the South Mountain ore deposits is of much interest and will be considered further on in these notes.

Messrs. J. C. Fuller and Jay Cooke own the Pine Grove property, which has had a very interesting history, extending back through many generations.

After inspecting the furnace and improvements, the company were entertained at luncheon in the park by Mr. Fuller, and took cars for Chambersburg. Here a visit was paid to Falling Creek Furnace. This is a small plant of modern construction, connected with which is a large grist mill run by steam-power generated by the waste gases of the furnace. The furnace is an iron-cased stack resting on iron columns; two tuyeres, bell and hopper, producing about 65 tons per week of cold-blast charcoal iron. The product is used chiefly for car-wheel purposes.

As arrangements had been made to pass the night at Chambersburg, the party was distributed among the three or four hotels of the place, and had time to inspect the town, as well as for rest and refreshment, before the evening, which was devoted to a meeting for papers and discussion. The local committee had secured the large hall of the Court House for this purpose, and it was found a most convenient and delightful place of meeting. The exercises were opened by Judge Roe, of Chambersburg, who, in behalf of the citizens and business men of that place, welcomed the association. Nothing could have been more delightfully entertaining than Judge Roe's speech, but it was, unfortunately, a great deal too long, and with the response of General Warner in behalf of the association, occupied nearly an hour, and left very little time for the practical business of the meeting. As this mistake is very frequently made, it is doubtful if your correspondent could make better use of a half inch of space than in reminding gentlemen who serve on local committees of arrangements, that while speeches of welcome, delivered by eminent citizens, are very pleasant and show a thoughtful regard for the amenities of hospitality, a few words well spoken are a great deal more appropriate and pleasing than long speeches, however eloquent.

The first paper of the evening was read by Mr. O. W. Davis, of Katandin Furnace, Bangor, Me., on "Desulphurizing Ores in the Westerman Kiln." It was a very carefully written and valuable paper, and we shall take pleasure in giving it somewhat fuller notice in a subsequent issue. In his experiments he had modified the kiln to adapt it for the use of wood, instead of gas, as fuel, and, after some changes, had reached results entirely satisfactory. The sulphur, which occurs in the ores in the form of scales or flakes, is rapidly volatilized and thrown off in great volumes and practically eliminated from the ore, at an average cost of 47.7¢ per ton. In addition, Mr. Davis gave some figures showing very satisfactory work in his furnace, with an important fuel economy resulting from the thorough preparation of the ores.

Mr. Jones Wister, of Harrisburg, was asked to discuss the subject, and very fully confirmed from his own experience the statements made by Mr. Davis. He had found, nevertheless, that however good the results which may be attained in desulphurization in kilns, it was cheaper and better to use ores containing little or no sulphur, and he was now doing nothing in the line to which Mr. Davis's paper referred. In his kiln experiments he had used pea coal (anthracite) with best results. He had operated chiefly on Cornwall ores, and while his kiln differed in some respects from that described by Mr. Davis, the results attained were practically the same.

The chairman, Col. Wiestling, referred to a question which had been raised by some statements made in his address the night before, and placed it before the meeting for discussion. The question was whether fire-brick hearths would answer as well in cold-blast as in hot-blast charcoal furnaces. There was a tradition in the charcoal-iron industry that, for some mysterious reason, fire-brick would not stand in a cold-blast furnace. He did not believe there was any good reason for this belief, and asked any one who had had any experience on this point to give it.

Mr. McDougal, of Three Rivers, Canada, stated that he had used both brick and sandstone hearths, and had found but little difference between them. He had not had as good success with American as with English bricks, but he had no doubt that with suitable bricks a hearth would last as long if made of sandstone.

Mr. Birkinbine thought there were better commercial than scientific reasons for the preference for stone hearths in cold-blast furnaces. These furnaces were mostly built in inaccessible places, remote from main lines of transportation, and for this reason stone crucibles cost less than fire-brick. This fact might account for their general use, and for the prejudice which existed in their favor. He saw no reason why brick should not last as well in a cold-blast as in a hot-blast furnace.

Mr. Lobdel gave the experience of several who had tried to use fire-brick hearths in cold-blast furnaces and failed. He knew of no reason why they should have failed.

Col. Wiestling thought it probable that the short life of brick hearths was due to bad fluxing.

There was a good deal of discussion on this subject, and the conclusion reached by most of those who took part seemed to be that, with good management, there should be no difficulty in making as long a run with a brick hearth in a cold-blast furnace as with one of stone.

Mr. Jean A. Mathieu was then called upon for an explanation of his process of making charcoal in retorts, but, owing to that gentleman's very limited command of English, he asked Mr. Birkinbine to speak for him. This duty was discharged by the secretary in a very clear and satisfactory manner. Mr. Mathieu's apparatus consists of two crescent-shaped retorts, jacketed on the outside and heated by combustion in a fire-brick chamber. As we should find it difficult to describe the apparatus without cuts, we shall not attempt to do so at this time, and shall confine ourselves to Mr. Mathieu's claims, which are certainly calculated to attract the attention of charcoal burners. These are set forth by Mr. Mathieu substantially as follows:

The quantity of charcoal ordinarily required for the daily manufacture of 17 tons of charcoal iron is 900,000 bushels per annum.

By the ordinary processes (yielding 35 bushels per cord of wood) this requires the carbonization of 25,700 cords of wood, giving, at $3 per cord, a yearly expense of	$77,100
By the Mathieu Furnace and process, for 900,000 bushels only 12,850 cords are required, giving, at $3, a yearly expense of	38,550
The result is a saving in the cost of wood of, say	$38,550
The cost of largest-size furnace for that yield is, say	16,000
Leaving a net saving in the first year of...	$22,550
While in subsequent years the saving is, of course, much greater, since the only deduction is for wear and tear.	

The distilled products (lost in the smoke by the old processes) are saved by the furnace and give an average yield, per cord, of:

200 lbs. acetate of lime or pyroligenite of lime, worth, say, 4 cents per lb	$8.00
One gallon wood spirit or methylic alcohol, worth, say	1.25
Total	$9 25
Expenses, cost of labor and time	2.25
Leaving a net profit of, per cord	$7.00
Which, upon a yearly consumption of 12,850 cords, would yield a net profit of.	89.950
Adding to this the net saving, as above, on cost of wood, gives us the net profit of	$112,500

From the above estimate it will be seen that the profit arising by products resulting from this process so far exceeds the cost of the mere production of the charcoal, that it may be safely asserted that the latter can be obtained, not only without cost, but with an actual profit in excess of the charcoal itself. The apparatus will last eight years, with some repairs from time to time. The products will differ, of course, with the different kinds of wood used: Thus, pine will yield less acetate of lime, but will give turpentine, rosin, creosote and paraffine, also a large amount of wood spirit.

The quantity of wood required being but one-half of that formerly used, the cost of transportation is proportionately less, and the furnace can be economically employed at a distance from the forests. In case, however, it is found more desirable to transport the 70 bushels of charcoal than the cord of wood, the apparatus can be taken apart (the heaviest piece not exceeding 1000 pounds in weight) for transportation, and thus can be readily moved and set up at different points in the forests. In this case also the acetates or pyrolignites can be made on the spot by using the ashes of the waste wood used for fuel.

The furnace enables the operator to produce charcoal of any quality desired, whether black, brown, heavy, or light, for blast furnaces, copper or lead works, gunpowder manufactories, for the purification of alcohol, sugar, &c., for disinfecting purposes and also for the filtering of water supplied by city water works. The waste gas can be used for illuminating purposes, or, together with the waste tar and wood remnants, for fuel. The crude pyroligneous acid can be sold for painting, preservation of woods, such as railroad ties, fences, wharves, boats, &c., for preservation of food and general antiseptic or disinfecting purposes. Acetate of lime is now imported into this country in large quantities, and is very extensively employed for the manufacture of acetic acid and the various salts thereof, such as acetates of alumina, iron, copper, lead, &c., which are largely used in printing and dyeing of stuffs, and in the manufacture of paper, leather, ink, white lead, chrome yellow, chrome green, Paris green, verdigris, &c. Turpentine and wood spirit is extensively used in the manufacture of varnish, and also in printing and dyeing. Rosin finds a large demand in naval construction; also in the production of lubricants for heavy machinery, gearing and carwheel bearings. Paraffine forms the principal ingredient in the manufacture of candles; it is also used extensively as a lubricant for delicate machinery, besides fulfilling many other requirements. Creosote is employed in large quantities in the preservation of railroad ties and other kinds of timber, while its consumption as a disinfectant is very extensive.

Mr. Mathieu exhibited samples of his charcoal, which were certainly of admirable quality, also of the by-products.

Next morning, at 8.30, the party left Chambersburg for Mont Alto, where the forenoon of Thursday was spent. The property of the Mont Alto Iron Company includes 20,200 acres. Of this 600 acres is laid out as a park. There are seven farms, averaging 100 acres each, and the balance is in woodland. The furnace is a hot-blast charcoal stack, 9½ x 36 feet, blown by 4 tuyeres with 3¼-inch nozzles. The density of the blast is 1¾ pounds, and the temperature 600° F. There is one run out fire, and a forge with 7 fires. The product of the works averages 16 tons pig iron per day and 7 tons of blooms, which is only about one-half the capacity of the forge. The furnace was built in 1808, and has had an eventful history. The ores smelted are local brown hematites, averaging 48 per cent. iron, low in phosphorus and practically free from sulphur.

As the Mont Alto and Pine Grove properties are on the same range, they may be properly included in one description, so far as their geological features are concerned. For the data on this subject we are indebted to Prof. Leslie's observations in 1864, in which year he examined and reported on both properties.

The brown hematite deposits of the South Mountain, to which those of Mont Alto belong, follow the outcrop edges of the slates and sandy limestones which everywhere form the southeastern edge of the great Cumberland Valley. As they are the residue of these beds after decomposition, they must be referred to the Silurian formation, and as the original rocks varied widely in their composition, the ores themselves show a great diversity. Two principal distinctions may be particularly noticed. The ores which have resulted from the decomposition of the slates are more disposed to be red-short, while those derived originally from limestones have a tendency to be more or less cold-short. Sometimes there is a mixture of the two in the same deposit, producing a so-called neutral ore. The banks containing the slate or red-short ores are geologically underneath those banks which hold the sand lime or cold-short ores. The belt of ore ground at Mont Alto crosses Antietam Creek at the Mont Alto Furnace, rises upon the hillside until it begins to ride upon the second or lower slope of the mountain between the upper and lower slopes. Within the first half mile there are several large pits, and 2200 feet from the furnace is the Home bank, in which there were in sight, in 1864, according to Professor Lesley, 250,000 cubic feet of ore ground. The entire belt between the furnace and one mile and a quarter beyond the Home bank, is estimated by him to have 11,000,000 cubic feet of ore ground above drainage level. It is likely that it continues equally rich to a much greater distance northward, along the face of the mountain, past White Rock Gap and toward the Conocochrague at Caledonia Iron Works. Professor Lesley held also that in its southern continuation, south of the Antietam, toward Quincy and Wanesboro', as large an amount can be obtained as north of the Mont Alto Furnace.

The ore in the ground consists of ball ore and wash ore, with lumps, plates and streaks of clay. The clay is thrown out where it is in sufficiently large lumps, and the rest is washed off. There remains a good deal of clay in the balls, which are irregular globes of hematite, often hollow and lined with beautiful ocicular crystals. Prof. Lesley estimates the quantity of lump clay in the ore at 5 to 10 per cent. by weight.

The proportion of clay to ore is greater near the surface than it is further down, so that the ore mass becomes denser and richer as the depth increases, the deepest openings striking into a very hard, pure ore. The ore washed from the upper workings averages 50 per cent. of metallic iron. Prof. Lesley estimates that the principal belt of the Mont Alto ore ground contains from 10,000,000 to 20,000,000 tons of ore per mile for a distance varying from one to three miles north of the furnace, and possibly an equal amount per mile south of it. Near the Mont Alto and Home bank belt is a second and a third one, the latter containing a hard ore. Three miles from the Mont Alto Furnace are the Pond and Caledonia banks and the English diggings, all three excavations separated only 100 to 200 yards interval from each other, being sunk in one immense deposit of ore, the covering of soil varying from 10 to 40 feet. Prof. Lesley estimated that a million and a half tons of ore could be taken, giving 50 feet only as the average depth of the ore, and deducting 50 per cent. for clay. The latter is an excessive estimate, although the clay is present in greater quantities than at the Home banks. On the other hand, the amount of silica is less.

The ores of Pine Grove Furnace are the same as those of the Mont Alto belt, although they occur in a long narrow valley in the heart of the South Mountain range. The principal developments are confined to a few miles above and below the furnace. The ore is nearly continuous the whole length of Mountain Creek, from about four miles above the furnace to below the mouth of Hunters' Run. Prof. Lesley, in a report to the Cumberland Valley Railroad Company, speaks of three banks, the two furnace banks and the upper bank. The best exhibition of ore occurs in the space of three miles, from a little below the forge to a little above the furnace. In this space he estimates there are a million of tons, and probably several millions. The ore is a rich brown hematite, containing, especially in the upper part, a considerable quantity of manganese, present in the form of oxide.

At Mont Alto the visitors were hospitably entertained at luncheon in the Park by Col. Wiestling. As the weather was fine, these picnicking features of the trip were greatly enjoyed.

From Mont Alto the party were carried back to Harrisburg, and spent the afternoon examining the iron works near the city. The first of these visited were the Central Iron Works and Chesapeake Nail Works, after which the association were conveyed to the Paxton Furnace and Wister's Furnace. These establishments were hastily inspected, and by dark the party returned to Harrisburg.

Thursday evening a meeting was held in the Hall of the Young Men's Christian Association, with a large attendance. The first paper of the evening was one by Prof. F. B. Hough, United States Commissioner of Forestry, on the preservation of forests. This paper was of much interest and value, and will be fully considered when we have the full text in hand. Such notes as we could give in this correspondence would not do justice to the subject or its treatment.

It was followed by a brief paper by Mr. Noble on forestry in Styria. These papers led to a very interesting discussion, showing that the charcoal ironmasters fully appreciate the importance of scientific forestry, and are anxious for information as to the best means of protecting the timber lands on which they are dependent, from a more rapid destruction than can be compensated by replacement from natural growth.

Mr. Milnes called attention to the need of some standard ton in the iron trade. He favored abandoning the long ton in selling blooms, and advocated the 2000-pound ton as the proper standard. A committee was appointed to consider this subject, and also that of a standard for the bushel of charcoal. The following is the resolution as adopted:

Resolved, That a committee of five be appointed by the chair to take into consideration the matter of the adoption of a uniform ton of 2000 pounds in all transactions in iron, and of the adoption of a uniform standard of measure and weight for charcoal; and that said committee be instructed to report at the next meeting; also, that the committee be instructed to request the co-operation of all iron workers and dealers in the United States.

A paper by Mr. Tyler, on "Furnace Work in Alabama," was then read by the secretary by title and its publication ordered by the association. This concluded the regular business of the meeting, and after the passage of resolutions of thanks to those who had placed the association under obligations, and to the secretary and other officers, the meeting adjourned.

During the session the following gentlemen were elected honorary members of the association:

Prof. Richard Ackermann, Stockholm; I. Lowthian Bell, Middlesboro'; Dr. Hermann Wedding, of Berlin; A. S. McCreath, Chemist Pennsylvania Geological Survey; F. B. Hough, United States Commissioner of Forestry; and J. C. Bayles, Editor of *The Iron Age*.

During the forenoon of Friday the convention was taken to Perry Forge, at Marysville. This is a compact, well-arranged and well managed establishment, owned by the Siedel Bros. It has six fires and one 6 tuyere run-out. From there the party went to the Harrisburg Car Works, which were hastily inspected, and then to the Pennsylvania Steel Works. This company has a large and excellent plant, which is being rapidly extended. There are two blast furnaces, both erected since 1872 and provided with the latest improvements. No. 1 stack is 60 feet high with 14 feet bosh, and No. 2 stack is 77 feet high with 17½ feet bosh. Each furnace has two nests of boilers with six in each nest, which generate steam for three upright blowing engines, each of 500 horse power, with blowing cylinders 7 feet diameter and 4 feet stroke that supply the blast to the furnaces. No. 1 furnace has a Kent hot-blast stove, and No. 2 furnace has Whitwell hot-blast stoves, using three stoves, each 18 feet diameter, 55 feet high, with a draft stack 175 feet high. The buildings are of brick. Each casting house being 140 feet long, the stock house 270 feet long, having two lines of railroad track on trestles extending through its entire length.

The converter house is a stone building 165 x 155 feet, in which there are two 5 ton converters. The blooming mill has a three-high train of 34 inch rolls, driven by a 500-horse-power upright engine. The rail mill has a three-high train of 23-inch rolls.

In 1875 the company erected an open-hearth plant for the production of Siemens steel in gas regenerative melting furnaces, which is also engaged in the production of steel ingots, utilizing scraps of steel from the blooming mill and rail mill, old steel rails and various kinds of steel scrap. A new plant of this description, much larger and with many improvements, is now in course of construction in a handsome brick building 125 x 106 feet. A department for the manufacture of railroad frogs and crossings, safety switches, &c., was organized in 1872, and this branch of business has become quite important. Its operations are conducted in a building 400 feet long, near the rail mill, where may be seen in quantity every description of tools and labor saving machinery adapted to the business. The materials used for the construction of the frogs, switches, &c., are the best quality steel rails, together with wrought and cast iron in various forms, and the fitting of same together is of necessity a mechanical operation requiring great care and thoroughness in every particular. The variety of styles produced and the large experience their specialists in this line have acquired would seem to indicate the ability of the company to meet every demand very satisfactorily.

To meet the greatly increased demand for rails and blooms, the construction of an additional Bessemer plant was decided upon some time ago, and the work has been in progress for several months. The principal part of the building has been completed, and part of the engines and machinery are in place. The building is of stone, 155 by 230 feet, with roof wholly of iron. There will be three converters, arranged in front of two pits. The outfit of cupolas will be ample for melting the iron as fast as the converters can take it, and all the arrangements will be on a scale calculated for handling a product of over 150,000 tons per annum. The foundations for the machinery are of the most massive character; many of them are of cut stone, evidently intended for very powerful engines. The machinery to be used in the new plant is all of it in process of construction in the extensive shops of the company.

The various sections of the repair department are worthy of notice, as they are of large capacity, such as the repairs and renewals constantly required in such an establishment would make a necessity, and also adapted for the production of the machinery and appliances of the new plants. There is a pattern shop, supplied with improved machinery for working wood—a fine brick building, 110 feet long, with pattern storehouse adjoining; also iron foundry, 170 feet long; carpenter shop; boiler shop, in which boilers and other forms of plate iron work are made, and machine and smith shops. The machine shop is one of the finest in the State—a brick building, 182 by 78 feet, filled with lathes, planers, drilling and other tools for the purpose of shaping and finishing the various parts of the machinery of all capacities, some capable of dealing with pieces of 20 tons weight. The artificial light used in this shop is an electric lighting apparatus, with seven lamps. Storehouses, with full supplies of iron and metal supplies, and lubricators, &c., are found in convenient locations, with attendants who record every issue of the materials, noting all transactions and reporting, at stated intervals, to the accounting departments. The handling of the large amount of material of all kinds required for the operations of the company and the shipment of the product is a matter of considerable moment. For the purpose of moving the cars received from the railroads, placing them in various parts of the works, weighing and shipping, there are in use four powerful shifting locomotives, and for moving iron, ingots, &c., there are two narrow-gauge locomotives in constant use. There are now nine miles of railroad track on the grounds. The plot of land occupied by the works was originally about 80 acres, but this has been increased by purchases during the present year to about 120 acres.

From the steel works the party returned to Harrisburg to dinner. At 1.45 p. m. they reassembled at the depot, and were carried to the Cornwall ore banks, near Lebanon. Unfortunately, more time was given to the furnaces than to the ore banks, and as the latter are much more remarkable than the former, they may properly claim all of such brief space as could be spared for both in this correspondence.

This remarkable deposit of magnetic iron ore rises from the surface along the northern border of the Mesozoic sandstone, which here forms the southern limit of the great Auroral limestone valley. The area of the ore exposed measures about 4000 feet in a direction nearly east and west, with a transverse breadth of from 400 to 800 feet, and includes three hills, separated by two valleys running nearly north and south. Of these hills the eastern, which is the highest, is said to be 960 feet above tide water, and a little over 300 feet above the brook flowing in the ravine which divides it from the middle hill. This, which is larger in area than the others, rises, in its highest part, nearly 100 feet, while the western hill is a little lower. A careful inspection shows that these elevations are due to the presence of a great ridge of eruptive rock, apparently a dolerite, which surrounds the eastern hill on the south, east and north, forms the northern border of the middle hill, and sweeps around the northern and western sides of the western elevation. Although now broken through at the two transverse valleys, this great belt of eruptive rock was probably once continuous, and being curved in form, like many of the dykes of the Mesozoic, has evidently served to protect the inclosed ore-bearing strata, which both to the east and the west have been eroded and swept away

(*Continued on page 22.*)

NEW PUBLICATIONS.

CONTRIBUTIONS TO THE HISTORY OF TIN MINING IN BOHEMIA AND SAXONY (BEITRAEGE ZUR GESCHICHTE DES TINNBERGBANES IN BOEHMEN UND SACHSEN). By Dr. Edward Reyer.

For some time Dr. Reyer has been devoting much labor to the history of tin mining in the chief producing districts of the world, and we have once or twice before placed before the readers of *The Iron Age* a summary of the fruits of his labors, as published by the *Oest. Zeitschrift*. It is natural that Dr. Reyer should have examined, with special care and with conspicuous success, the records of that old and once prosperous mining industry of Bohemia and Saxony, which reaches as far back as the year 1200, and flourished in 1450, 1550 and again in 1750. The vicissitudes of all the districts were sudden and great. All underwent the change from stream washing to lode mining, and many suffered from enormous collapses of the mines, which were, it appears, often injudiciously managed. Dr. Reyer's account contains many notes of interest. He tells us that stamp mills were introduced in the beginning of the sixteenth century, and that it was in 1507 that one Maltitz introduced the use of water during stamping—an invention for which special privileges were granted to him. It appears that the manufacture of tin plate commenced in the beginning of the seventeenth century, and that one Drebbel taught the use of tin salts in dyeing in 1630.

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52,000 pounds Loose Joint Butts at 5 cents per pound.

1000 gross Wardrobe Hooks, coppered, at 6 cents per pound.

Above goods are the best in market, put up in pasteboard boxes.

4000 pairs Strap Club Skates. Cheap.

1000 pairs Key Club Skates, at 50 cents per pair, 8½, 9 and 9½ inches.

100,000 gross Screws, at less than market rates.

1000 dozen Loose Handle Rolling Pins, at 60 cents per dozen.

10,000 dozen pairs Loose Pin Figured Butts, 60 per cent. discount.

500 dozen pairs Loose Pin Figured, Silver Tipped Butts, 60 & 20 per cent. discount, 3½ x 3½, 3 x 3½ and 3 x 3.

2000 dozen Axle Pulleys, Ground Wheel, at 20 cents per dozen.

An immense stock of all kinds of Shelf Hardware at less than factory prices.

Send and get my figures before buying elsewhere.

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Horizontal Boiler, 42 in. x 10 ft., 28 4-in. tubes, ⅜ shell, 7-16 heads.
Horizontal Boiler, 42 in. x 10 ft., 90 2-in. tubes, 5-16 shell, ⅜ heads.
Vertical Boilers, with Bases, Grates and Fixtures:
42 in. x 7 ft., 90 2-in. tubes, shell and fire-box ⅜ in., heads ½ in. New.
36 in. x 6 ft., 80 2 in. tubes, shell and fire-box 5-16 in., heads 5-16 in. Rebuilt.
30 in. x 6½ ft., 47 2-in. tubes, shell and fire-box 5-16 in., heads 5-16 in. New.
30 in. x 6 ft., 55 2-in. tubes, shell and fire-box 5-16 in., heads 5-16 in. Second hand.
15½ x 36 Horizontal Engine, 9 ft. x 18 in. band wheel. Jacob Naylor.
12 x 24 Horizontal Engine, segment fly wheel 4500 lbs James Moore.
10 x 20 Horizontal Engine, band wheel 7 ft. x 12 in.
12 x 12 Vertical Engine, band wheel 54 in. x 12 in.
7 x 12 Vertical Engine, band wheel 42 in. x 10 in.

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One Horiz'l Engine, 9 in. x 12 in. Erie Iron Works.
Five Horizontal Engines, 9 in. x 12 in. J. & R. J.
Four Horizontal Engines, 8 in. x 12 in. [Gray.
One Horizontal Engine, 3 in. x 6 in.
One Portable Engine, 5 horse power
Two Horizontal Return Tub. Boilers, 100 h. p. each.
Two Hor. Tub. Boilers, 5 ft. x 14½ ft., 100 2¾-in. tubes
One Hor. Tubular Boiler, 5 ft. x 15 ft., 83 3-in. tubes.
One Hor. Tubular Boiler, 6 ft x 14 ft. 67 4-in. tubes.
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MACHINISTS' TOOLS.

One Lathe, 19 in. swing, 10 ft. bed. Fitchburg Ma-
One Lathe, 32 in. x 20 ft. bed. [chine Co.
One Lathe, 16 in x 7 ft. bed.
One Lathe, 14 in. x 5 ft. bed. N. Y. Steam Eng. Co.
One Planer, 22 in x 5 ft. bed.
One Planer, 36 in. x 16 ft. bed. Chain feed.
Two Crank Planers, 18 in. x 2 ft.
One New Haven Drill. Will bore in center of 60 in.
One New Haven Drill. Will bore in center of 30 in.
Two Ensley Drills.
One Vertical Boring Mill, bore from 26 to 90 inches.
One Turn Table and Boring Mill, 12 feet between
One Travis Boring Mill. [columns.
Two Slabbing Machines.
One Merrill Compressed Air Hammer, Hotchkiss
One Upright Drill, to the center of 61 in. [Patent.
One " " " " " " 42 in.
Eighteen Drilling Machines.
Ten Bench Lathes.
One Bogardus Mill, No. 5.
One Bogardus Mill, No. 2.
One Root Blower, No. 1.
One Sturtevant Blower, No. 2.
One Large Power Punch for bridge work.
One 3000 ton Hydraulic Press and Pump.
One Dudgeon Beam Punch.
One Punch and Shears combined, will punch 1¼ hole in 1-inch iron in the center of 30 in.
One large Shears, will cut ¾ iron any size.
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Three Vacuum Tanks, 6 ft. x 12 ft.
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7900 lbs. ¼ Plate Iron, for safes.

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One Lamson, Goodnow & Co. 2-spindle Profiling Machine.
One Engine Lathe, 90 in. x 20 ft.
One Engine Lathe, 30 in. s. x 20 ft., good order.
One " " 30 in. s. x 16 ft. Wheeler, new.
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Two " " 20 in. x 8 ft. Ames, new.
One " " 16 in. x 6 ft. New Haven, good order
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One Fox Lathe.
Six Hand Lathes, 11, 14 and 16 in. s. x 4½ to 7 ft. bed.
One 16 in. stroke Shaper. Wm. Sellers & Co., A1.
Six 9 in. " " Hewes & Phillips.
Two 15-in. stroke Shapers. Hendey Mach. Co., new.
One 32 in. x 10 ft. Planer. Lathe & Morse.
One 24 in. x 5 ft. " Moore & Wyman.
Two 27 in. x 4 ft. Planer. Windsor Mfg. Co.
One 20 in. x 4 ft. Planer. Whitcomb.
One 16 in. x 4 ft. Planer. New Haven.
One 38 in. Drill, bk. geared and self-feed. New Haven,
One 34 in. " Bk. Geared. [new.
Six 20 in. " Prentice, new.
One 6-Spindle Horizontal Drilling Machine,
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Four Newell Punch Presses.
Three No. 4 Wilder Punch Press. New. Geared.
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Pit Lathe, 16 ft. swing, will turn a pulley 30 inch face, with gear-cutting attachment.
Lathe, 40 in. swing, 27 ft. bed.
Lathe, 54 in. swing, 26 ft. bed.
Lathe, 100 in. swing, 18 ft. bed.
Lathe, 30 in. swing, 15 ft. bed. New.
Lathe, 15 inch swing, 6 ft. bed. New.
Lathe, 28 in. swing, 26 ft. bed.
Lathe, 26 in swing, 16 ft. bed.
Lathe, 24 in. swing, 15 ft. bed.
Lathe, 21 in. swing, 8 ft. bed.
Lathe, 19 in. swing, 6¾ ft. bed.
Lathe, 17 in. swing, 5 ft. bed.
Horizontal Drilling Lathe, 24 in. swing, 19 ft. bed.
Machine for facing and drilling pipe flanges, automatic.
Planer, 32 in. wide, 6 ft. long.
Planer, 26 in. wide, 5 ft. long. New.
Planer, 16 in. wide, 3 ft. long. New.
Planer, 24 in. wide, 6 ft. long.
Planer, 33 in. wide, 5 ft. long.
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Planer, 52 in. wide, 18 ft. long.
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Upright Drill Press, 16 in. swing.
Upright Drill Press, 36 in. swing.
Upright Drill Press, 48 in. swing.
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Upright Boring Mill, 4 ft. between uprights.
Shaping Machine, 16 in. stroke.
Milling Machine. Lincoln pattern.
Gear Cutting Machine.
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Boring Bar, 12¾ in. diam., 10 ft long, self-feeding.
Boring Bar, 9 in. diam., 8½ ft. long, self-feeding.
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THE

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Engine Lathes from 20 inch to 100 inch swing.
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The above Patterns are for sale in one lot or separately, and finished work from these Patterns will be taken in payment, if desired.

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LARGE SLOTTER, Table 4 ft., 6 ft. between columns, stroke 18 in., end and cross and circular movements. A heavy, well-built tool; in first-rate order; will be sold low. Photo. on application.

Also, two Column Drills, Suspension Drill, two Lathes, two Tank-Iron Punches, three Hydraulic Jacks, Hydraulic Press Pump, eighteen good Steam Pumps, two large Pulsometers, two Power Piston Blowers, 8 and 10-inch cylinders.

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AN OLD-ESTABLISHED MANUFACTURER OF HARDWARE wishes to secure the services of a person who is thoroughly acquainted with the Hardware trade, and who is handling a line of goods not conflicting with his own, to sell his goods on commission from January 1, 1881. Address, giving name and names of firms now representing, with reference,

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To Iron Manufacturers

FOR SALE.

The ROLLING AND PUDDLING MILLS of the late Hudson River Iron Co., at Poughkeepsie, New York. This property is well situated on the Hudson River and New York Central and Hudson River Railroad, and is in good condition for immediate occupancy. It contains all the machinery necessary for the manufacture of Merchant Iron, Rail and Bolt Spikes, Bolts, &c. Parties in search of this kind of property are invited to examine, and for other particulars to address

W. S. JOHNSTON, Trustee,
Poughkeepsie, N. Y.

To Railroad Engineers, Importers and Others.

DAVID OWEN,

Inspector of Steel and Iron Rails,

Merthyr Tydfil, England,

Undertakes the inspection of Steel and Iron Rails, Permanent Way Materials, &c., &c., in England, Belgium and Germany. Thoroughly practical, of many years' experience. Can give very best of references from chief railroad engineers, merchants and others who have employed me to inspect their railroad materials during manufacture and delivery for the last 10 years.

Correspondence solicited. Instructions by mail or cable punctually attended to.

For Sale.

Stock of hardware, stoves and implements, and store furniture, in one of the best towns in Kansas.

Address HARDWARE,
Box 766, Salina, Kansas.

THOSE WISHING TO BUY OR HAVE FOR SALE SECOND-HAND

PRESSES or DROP HAMMERS

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N. C. STILES,
Middletown, Conn.

For Sale.
Cold Blast Charcoal Furnace.

First-class in every respect and ready for immediate blast. Stone stack, ample water power; 2000 cords seasoned wood on hand. Charcoal can be had at 4½ cents per bushel at furnace. For further particulars address

ROBERT W. MONROE,
Kingwood, W. V.

The Sherman Process Co.

9 Pemberton Square, Boston, Mass.,

Issue Licenses to use the Process for the Manufacture of Iron and Steel

In the Bessemer Converter, Crucible, Siemens-Martin, Puddling, Blast and Cupola Furnaces.

The use of this Process improves the quality of the product, saves fuel and labor, and does not require any change in furnace or manner of working

See page 17 of *The Iron Age* of Oct. 25th 1877.

Wanted.

A GOOD ROLL TURNER, accustomed to designing Shape Iron. Apply to

PENCOYD IRON WORKS,
265 South Fourth St., Philadelphia.

For Sale.

In Southern Central Iowa, the only wholesale and retail

Heavy and Shelf Hardware Store

at the county seat of a county containing 30,000 inhabitants, is offered at reasonable figures. Business established for 30 years. Cash customers only need apply. Address, J. STEELE,

Office of *The Iron Age*, 83 Reade St., New York.

Just Published.

STEEL:

Its History, Manufacture, Properties, and Uses.

By J. S. JEANS,

Secretary of the Iron and Steel Institute.

Section I. *History of Steel:* Chap. 1. History of Steel; 2. Early History in England; 3. Progress of Invention; 4. History of Bessemer Process; 5. Siemens-Martin Process; 6. Other Steel-making Processes; 7. Steel in America; 8. Germany; 9. France; 10. Austria; 11. Russia; 12. Sweden; 13. Other Countries.—Section II. *Manufacture of Steel:* Chap. 14. Cementation and other Methods; 15. Manufacture by Bessemer Process; 16. Siemens-Martin Process; 17. Other Methods.—Section III. *Chemical and Physical Properties of Steel:* Chap. 18. Phosphorus in Steel; 19. The Use of Manganese; 20. Spiegeleisen; 21. Sulphur in Steel; 22. Silicon in Steel; 23. Tensile Strength of Steel; 24. Mechanical Tests of Steel; 25. Analysis of Steel.—Section IV. *Uses of Steel:* Chap. 26. Application of Steel to Railway Purposes; 27. To Shipbuilding; 28. To Bridge Building; 29. To General Purposes; 30. Guns and Armor Plates; 31. Other Purposes.

Price.....$14.50

For Sale by

DAVID WILLIAMS,
83 Reade St., New York.

Trade Report.

Office of The Iron Age, Wednesday Evening, October 27, 1880.

The past week has been an active one in financial circles, but without event of startling interest. The money market continues easy, with 2½ @ 3 % as the ruling rates to borrowers on call.

The importations of specie and bullion at this port during the past week were $6,940,399, consisting of $6,867,662 in gold and $72,737 in silver, as against a total of $4,947,387 for the corresponding week of last year. The importations since the 1st of January and since the 1st of August compare as follows with the movement during the corresponding periods last year:

	1880.	1879.
Since January 1		
Gold	$42,401,227	$48,643,192
Silver	4,139,601	6,875,890
Total	$46,540,828	$55,519,082
Since August 1		
Gold	$40,446,860	$47,811,467
Silver	945,095	1,536,337
Total	$41,391,955	$49,347,804

Early in the week the market for government bonds was strong, with an upward tendency, but later it became very quiet, with a fractional decline in 4s and 4½s of ½ @ ⅝ of 1 %. On Wednesday last the Treasury accepted $2,500,000 of bonds for the sinking fund. State bonds remain quiet and firm; railroad mortgage bonds strong at prices 1 @ 5 % higher than last week.

The stock market has again manifested a buoyant tendency, and the advance in prices has been very marked, the regular dividend paying shares leading the upward movement. Northwest, Milwaukee and St. Paul, New York Central, Lake Shore, Michigan Central, Rock Island, Louisville and Nashville and Chicago and Alton advanced 2 @ 12 %, the quotations for several of these stocks having been the highest ever attained. On Friday it was rumored that the representatives of the Western roads had been unable to come to an understanding, and a sharp "bear" attack was made on the entire list, although at the time it was known to many that all questions in dispute had been amicably adjusted, as was afterward publicly announced. Wabash, St. Paul and Omaha and Pittsburgh, Titusville and Buffalo remained strong.

The bank averages for the past two weeks compare as follows:

	Oct. 16.	Oct. 23.	Comparison.
Loans	$315,811,900	$317,043,300	Inc. $1,231,400
Specie	67,364,300	65,613,900	Dec 1,750,402
Legal t'nd'rs	13,035,000	13,159,380	Inc. 124,300
Tot. reserve	80,399,300	78,779,200	Dec. 1,626,100
Deposits	302,566,900	300,881,020	Dec. 1,735,800
Reserve required	75,641,725	75,207,750	Dec. 433,975
Surplus	4,757,575	3,565,450	Dec. 1,192,125
Circulation	18,629,100	18,700,600	Inc. 79,500

The foreign trade movements for the week are shown in the following tables:

FOREIGN IMPORTS.

For the week ended October 23:

	1878.	1879.	1880.
Total for week	$4,539,773	$7,141,839	$9,339,665
Prev. reported	227,613,056	253,577,444	389,118,656
Since Jan. 1	$232,152,829	$260,719,283	$398,458,321

Included in the imports of general merchandise for the week were articles valued as follows:

	Quantity.	Value.
Anvils	118	$795
Brass goods	19	3,597
Bronzes	42	12,762
Chains and anchors	16	795
Copper	..	4,455
Cutlery	158	62,060
Pins	2	106
Guns	47	9,042
Hardware	14	1,093
Iron, hoop, tons	451	20,901
Iron, pig, tons	2,470	42,668
Iron, sheet, tons	2	208
Railroad bars	9,507	72,768
Iron cotton ties	4,560	4,204
Iron ore, tons	1,409	3,336
Iron, other, tons	3,446	84,239
Metal goods	215	22,129
Needles	19	6,779
Nickel	11	1,960
Old metal	..	1,271
Platina	1	4,644
Plated ware	4	899
Percussion caps	4	693
Saddlery	12	3,384
Steel	8,524	41,972
Silverware	9	435
Tin, boxes	48,652	236,181
Tin, 12,116 slabs; 1,070,240 lbs	..	265,871
Wire	2,514	15,440

EXPORTS, EXCLUSIVE OF SPECIE.

For the week ended October 26:

	1878.	1879.	1880.
For the week	$7,455,993	$7,763,314	$8,324,715
Prev. reported	275,486,876	271,031,345	327,590,252
Since Jan. 1	$282,942,869	$278,794,659	$335,914,967

EXPORTS OF SPECIE.

For week ended October 23:

Total for the week	$317,807
Previously reported	6,174,027
Total since January 1, 1880	$6,491,834
Same time in 1879	18,062,389
Same time in 1878	11,045,850
Same time in 1877	23,792,196
Same time in 1876	41,485,204
Same time in 1875	67,031,774
Same time in 1874	44,004,712
Same time in 1873	43,736,183
Same time in 1872	62,276,907

Government bonds close strong at the following quotations:

	Bid.	Asked.
U. S. 6's 1880 registered	102⅝	102⅞
U. S. 6's 1880 coupon	102⅝	102⅞
U. S. 6's 1881 registered	104⅞	105⅛
U. S. 6's 1881 coupon	104⅞	105⅛
U. S. 5's 1881 registered	101¾	102
U. S. 5's 1881 coupon	103	103⅛
U. S. 4½'s 1891 registered	110¼	110⅜
U. S. 4½'s 1891 coupon	110¼	110⅜
U. S. 4's 1907 registered	109¼	109⅜
U. S. 4's 1907 coupon	109¼	109⅜
U. S. Currency 6's 1895	125	—
U. S. Currency 6s 1896	125⅛	—
U. S. Currency 6s 1897	126	—
U. S. Currency 6s 1898	126½	—
U. S. Currency 6s 1899	127	—

The following were the closing quotations of shares in the active list at the New York Stock Exchange:

	Bid.	Asked.
American District Telegraph	73½	74½
Atlantic and Pacific Telegraph	41½	42¼
Alton and Terre Haute	29¾	30⅞
" " Pref	—	90
American Union Telegraph	60¼	60¾
Arizona	7¾	8
Burlington and Quincy	144⅞	145
Burlington and Cedar R. and N	68½	69
Chicago and Alton	133⅛	133½
" " " Pref	135	140
Caribou	2	2¼
Climax	⅝	¾
Chesapeake and Ohio	20½	20¾
" " 1st Pref	27	27¾
" " 2d Pref	21½	22
Chicago, St. Louis and New Orleans	39	39½
Clev., Col., Cin. and Indianapolis	79	79½
Colorado Coal and Iron	24	25½
Central Pacific	74¼	74¾
Canada Southern	68⅞	68⅞
Col., Chic. and Indiana Central	19⅛	19⅜
Delaware, Lack. and Western	97	97⅛
Delaware & Hudson Canal	86¾	87
Denver and Rio Grande	73¼	74
Deadwood	14	15
Erie	44¾	44⅞
" Pref	75½	75¾
Erie and Western	33½	33⅝
Express—Adams	117	118
" Wells, Fargo & Co	112½	114
" American	64	64¼
" United States	53	54
Excelsior Mining	7¾	8½
Hannibal and St. Joseph	41¾	41⅞
" " Pref	87⅛	87¼
Houston and Texas	74	74½
Homestake	31	32
Int. and Great Northern	38	40
Iron Mountain	52⅛	52¼
Indiana, Bloom. and Western	37	40
Illinois Central	118¾	118¾
Kansas and Texas	38½	38¾
Keokuk and Des Moines	10	13
" " Pref	29	36½
Little Pittsburgh	2	2½
Louisville and Nashville	169¾	170
Lake Shore	115	115⅛
Morris and Essex	116	116½
Michigan Central	108⅛	108¾
Marietta and Cincinnati Pref	6½	7
" " " 2d Pref	4	4½
Mobile and Ohio	23¼	24
Metropolitan Elevated	111	111½
Manhattan Elevated	37¼	37¾
New York Elevated	117½	118
Northern Pacific	29½	30
" " Pref	53	53¼
New Jersey Central	77⅛	77¼
Northwest	115⅞	116
" Pref	140½	140¾
New York Central	135	135¼
Nashville and Chattanooga	63	64
New Central Coal	26	28
Ontario Silver	31½	32½
Ohio Central	26¾	27
Ontario and Western	24⅞	25⅛
Oregon Navigation	127	129
Ohio	35¾	36
" Pref	77⅛	78
Pittsburgh, Titusville & Buffalo	34½	35
Pacific Mail	45⅞	45¾
Peo., Dec. and Evans	27¼	27½
Quicksilver	11	14
" Pref	52	54
Rock Island	122	122⅛
Reading	43¾	44
St. Paul	105½	105⅝
" Pref	119¾	119¾
St. Paul and Omaha	45⅝	45¾
" " " Pref	85⅝	85½
Standard	26½	27
Sutro Tunnel	1⅛	1¼
San Francisco	36½	37
" " Pref	47¼	47½
" " 1st Pref	74¼	75
Silver Cliff	2½	3
Texas and Pacific	34¾	35
Union Pacific	92¼	92½
Wabash	41¾	42
" Pref	74⅛	74¼
Western Union Telegraph	103⅜	103¾

MINING STOCKS.

The following were the closing quotations of the New York Mining Stock Exchange:

	Bid.	Asked.
Amie	59	61
American Flag	....	35
Bechtel	1.35	1.50
Bonanza C	26	28
Buckeye	19	20
Calaveras	29	30
California	2.00	2.10
Climax	....	67
Consolidated Virginia	2.75	2.80
Consolidated Imperial	21	23
Chrysolite	7⅛	....
Dahlonega	10	11
Durango	16	....
Dunderberg	70	75
Goodshaw	54	55
Granville	8	9
Great Mountain	4.10	4.20
Horn Silver	14	15½
Hukill	1.85	1.90
Lacrosse	29	30
La Plata	....	5.00
Lucerne	13	14
L. Chief	1.05	1.20
Moose	54	55
Maybelle	16	....
N. Y. & C.	....	1.40
Plumas	....	1.40
Rappahan	24	26
S. Bodie	10	15
S. Bulwer	71	75
Silver Cliff	2.60	3.00
Sutro	1.15	1.25
Unadilla	15	16

GENERAL HARDWARE.

Since our last a decided decline has taken place in the demand for Hardware, though there is still a fair business doing and manufacturers are well supplied with orders. This is particularly the case with makers of Forks, Hoes, and that line of goods, many of whom are almost sold up for next season.

There is a much better demand for Nails, and business is becoming more active, apparently owing to the conviction on the part of consumers that recent concessions have brought the rates near the lowest limit. There has been no change in rates during the last week, and orders are freely placed at the figures then given.

The American Screw Co., Union Steel Screw Co., Russell & Erwin Mfg. Co., Massachusetts Screw Co., United States Screw Co. and Philadelphia Screw Co. on the 21st inst. adopted the following prices for Wood Screws:

Flat Head, Iron	dis 45 %, unchanged.	
Round Head, Iron	40 %, instead of dis.	35 %
Flat Head, Brass	45 %, " "	35 %
Round Head, Brass	30 %, " "	20 %

No prices are guaranteed.

The factory of the Ansonia Clock Company, at Brooklyn, with the entire plant of special machinery, stock of raw material and a large quantity of finished and unfinished goods, was totally destroyed by fire this morning. The loss is estimated by Mr. Wm. E. Dodge, Jr., president of the company, at about $500,000, which he states is fully covered by insurance. The company supplied a large export trade, besides its domestic trade, and had, a little more than a year ago, built the Brooklyn factory, which had a capacity of from 40,000 to 60,000 clocks per month and gave employment to upward of 1000 hands.

The Greenfield Tool Company issues the following discount sheet under date of the 8th inst.

PLANES.

All first grade Bench and Molding Planes to No. 739, (except Planes with English Irons)	dis. 25 %
Bench, second grade, stamped "New York," (same list as No. 23 to 30)	dis. 30 %
Bench Planes with English Irons (Moulson Bros.)	dis. 20 %
Bench Planes without Irons	dis. 20 %
Plane and Saw Handles	dis. 30 %
Plane Irons, "Diamond" Stamp	dis. 30 %
Plane Irons, "Mason Bros."	dis. 40 %
Plow Bits, Molding Irons, &c	dis. 10 %

Terms.—Thirty days from date of invoice. Subject to sight draft, with exchange, at expiration of time stated; 7½ per cent. special discount if paid within ten days.

BOLT CUTTERS AND BEVELS.

Reece Bros. Patent Screw Plates and Hand Bolt Cutters, Taps and Dies, &c	dis. 20 %
Stratton's Patent Levels	dis. 25 %

Parker's and Colburn's Patent Forged Concave Ox Shoes:

Orders for 1 ton or over....per pound net,	11¢
" ½ " "	11½¢
" ¼ " "	12¢
" less than ¼ ton... "	12½¢

Terms.—Thirty days from date of invoice. Subject to sight draft, with exchange, at expiration of time stated. One per cent. special discount if paid within ten days.

The E. D. Clapp Mfg. Co. issue the following notice to the trade:

Auburn, N. Y., Oct. 23, 1880.

Having purchased letters patent No. 152,848, dated July 7, 1874, we are owners and sole manufacturers of Lamb's Patent Seat Fastener. This simple and strong Fastener is now in use on over 100,000 vehicles in the United States and Canada, and we have yet to hear that an accident has ever happened by the upsetting of a seat to which Lamb's Fastener has been attached. We solicit a sample order from merchants who have not sold this Fastener.

The E. D. Clapp Mfg. Co.

BRITISH IRON MARKET.

[*Special Report by Cable to The Iron Age.*]

London, Wednesday, October 27, 1880.

Scotch Pig.—The market is quiet, with a fair business. Prices are firm. We quote, makers' prices:

Gartsherrie	62/
Coltness	63/
Glengarnock	56/
Eglinton	52/6

These are the same figures given last week, except for Coltness, which is quoted 1/ higher.

Manufactured Iron.—The weakness in prices continues, and transactions are not large. We quote, unchanged. Best Staffordshire Bars at £7. 10/.

Steel Rails.—The market is active and prices firm. Quotations are unchanged, viz.: Ordinary sections, £5. 15/ @ £6. 5/.

Iron Rails.—The market remains in the same condition noted last week—a fair business doing, with prices steady. Welsh are quoted, unchanged, £5 @ £5. 5/.

Old Rails.—The offerings are moderate and sales fair. Prices are steady. Old Ts, £3. 15/.

Scrap.—There is a small business doing in Scrap, and prices are weak.

IRON.

American Pig.—The inactivity which has characterized the market for weeks past still continues. The causes noted in our last writing still continue to shape the course of affairs. Foreign Pig is offered at low figures, Middlesborough being quoted at $18, while bids are lower than that even. Little business has been done during the week, but the market shows a slight tendency to greater firmness. Good No. 1 Foundry is still scarce, and has brought as much as $26 for a lot of 100 tons disposed of recently; 900 tons Thomas No. 2 X sold at $20. We quote Foundry No. 1, $25 @ $26; Foundry No. 2, $20; Gray Forge, $19 @ $19.50.

Scotch Pig.—Though quiet, the market for Scotch Pig is a little firmer. We note sales of 300 tons Gartsherrie at $22.50, to arrive, and a lot of 200 tons of Glengarnock on private terms. We quote: Glengarnock, $23; Gartsherrie, $22.50 @ $23; Eglinton, $21.50, and Coltness, $23.50.

Rails.—But little business has been done and prices remain unchanged, both for Steel at $59 @ $63, and Iron at $46 @ $48.

Old Rails.—There is more inquiry for Old Rails. For Ts $26 is asked, while $25.50 is offered, and Double Heads are held at $26.50.

Scrap.—We quote $25 @ $26, from ship and yard.

Manufactured Iron.—Business in the various grades of Manufactured Iron is very quiet, at prices which show no change from those which have been recently quoted.

METALS.

Copper.—Sales for the week have been confined to 150,000 lbs. Lake Superior at 18⅝¢ @ 18⅞¢. At the close 19¢ is asked, although probably lower figures would be accepted.

DOMESTIC EXPORT OF COPPER FROM THE UNITED STATES.

	1880. Eight months. Quan.	1880. Value.	1879. Quantity	1879. Value.
Ore, cwts	15,595	$50,865	6,027	$30,104
Ingots, lbs	274,471	52,955	12,549,827	1,890,025
Manufact'rs	....	45,278	....	53,964
Cartridges	....	399,313	....	298,784
Total	....	$548,411	....	$2,272,877
Re-export.—Ores, mfrs. and ingots	....	58,519	....	14,388
Total	....	$606,930	....	$2,287,265
IMPORT.				
Ore, cwts	27,872	$136,600	....	....
Ingots, lbs	4,298,156	675,877	74,946	$8,414
Manufact'rs	....	260,652	....	185,202
Total	....	$1,073,129	....	$193,616

"London, October 16.—This week there has been a stronger market for this metal, and a better inquiry for Chili Bars has sprung up, and prices have been stiffening almost daily. On Monday the market opened at £60. 10/, at which it remained firm until Wednesday, when buyers became rather more numerous, and £60. 15/ was touched. Yesterday the market further improved and £61 spot was quoted, the market closing to-day at £60. 15/. The comparatively moderate prices ruling, combined with the slightly more favorable statistical position of this metal, are the reasons why operators are again giving their attention to this market; but the heavy losses which were made during the first half of the year by the continuous drop which then occurred, may in a measure damp the ardor of operators, and deter them from entering again into large contracts. The charters for the first half of this month will shortly be known, and if light will help to strengthen the market. The better prices realized for the raw material have formed some influence upon prices for manufactured, and it is difficult now to get sellers to submit to concessions." Per cable, October 27.—Chili Bars, £61. 10/; Best Selected, £66. 10/. Manufactures remain as under: Bottoms, 31¢; Braziers, according to size, 28¢ @ 34¢; Circles, 31¢ @ 34¢; Segment Sheets, 31¢; Fire-box Sheets, 28¢; Sheathing, 26¢; and Bolt Copper, 28¢.

Tin.—Our market has ruled rather quiet during the week until yesterday, when 300 to 400 tons Straits were sold at 19¾¢ to large holders of Tin; 19¾¢, cash, has since been offered. Singapore cables $26.75 per picul, and London, Straits, £87. 10/. We quote at the close, large lots Straits, 19¾¢ @ 20¢; Australian, 19½¢ @ 19¾¢; Billiton, 19½ @ 19⅝¢. The import of Block Tin into the United States during the first eight months has been 10,206 tons, against 7585 tons during the same time last year. The actual import has, therefore, been at the rate of about 15,000 tons per annum, after deducting the trifling re-export. In other words, the supply has been fully in keeping with the supposed consumption of about 1200 tons per month. "London, Oct. 16.—This market has continued animated, and prices have further improved, the turnover from day to day being very large. On Monday the market opened at £86 @ £86. 10/, remaining steady throughout; Tuesday and Wednesday at about these figures; and after 'change on Wednesday afternoon rather better prices were realized. Yesterday a large business was done between £86. 10/ @ £87, according to prompts, and to-day the market has been very excited, beginning at £87, and advancing quickly to £87 10/, sharp cash; 1500 slabs of Billiton sold at £87. 2/6. Operators have so great an interest in the improvement of prices that they may continue to purchase. At the public sale at Batavia, on the 12th inst., the tin auction realized an average price of 58¼ guilders." *Tin Plates.*—A large business has been done for delivery next year at prices of from 12½¢ @ 25¢ per box above ruling rates, and there is now a better feeling than has been observable for some weeks past. At Liverpool the market is pretty steady; Coke Tins at 14/9, with occasional cheap lots under that figure. The import of Tin Plates into the United states during the first 8 months of the year has been 108,716 tons, against 95,284 tons during the corresponding period of last year. We quote at the close, large lines, ordinary brands, per box: Charcoal Bright, $6.12½ @ $6.25; ditto Ternes, $5.37½; Coke Tins, $4.87½ @ $5, ditto Ternes, $4.87½.

Lead.—Since the large sales reported last week holders display greater strength, and 500 tons Newark sold at 4.70¢ @ 4.75¢, which is the closing quotation. For Refined, 5⅛¢ is asked. At St. Louis 1000 tons Refined sold during the week at 4.60¢ @ 4.70¢, which is equal to 5.05¢ @ 5.15¢ here. "London, October 16—The market keeps steady, and owing to the continuance of a limited demand, no particular improvement seems likely to take place in prices yet awhile." Manufactures are quoted as follows: Sheet Lead, 7¢; Lead Pipe, 6½¢; Tin-lined ditto, 15¢, and Block Tin Pipe, 40¢.

Spelter and Zinc.—There has been no change in the dull attitude of Spelter, Common Domestic not bringing over 5¢ @ 5¼¢, and foreign, according to brand, not over 5⅝¢ @ 6¢. Sheet Zinc, 7¼¢.

EXPORT OF SPELTER AND ZINC DURING EIGHT MONTHS.

	1880. Pounds.	1880. Values.	1879. Pounds.	1879. Values.
Spelter, in slabs	5,854,173	$281,701	1,335,003	$47,955
Sheet Zinc	3,369,493	178,119	1,220,235	54,816
Total	9,223,666	$459,820	2,555,238	$102,771
DOMESTIC EXPORT.				
Ore, cwts	4,330	$13,955	6,234	$20,924
Slabs and sheets, lb	1,479,447	131,415	416,530	31,727
Total	....	$145,370	....	$52,651

"London, Oct. 16.—Orders are few, the shipping trade being especially slack. Quotations, however, have undergone little or no change, but in the absence of inquiries are merely nominal."

Antimony.—This metal is neglected at 14¢ for Johnston, 14½¢ for Hallett and 15¢ for Cookson.

OLD METALS, PAPER STOCK, &c.

We note considerable reduction in prices of Old Metals this week, with a prospect of a still further decline, the demand being very light. There is a slight reduction in prices of Paper Stock, the market for which continues dull.

The purchasing prices offered by dealers for Old Metals are as follows:

Copper, heavy	₩ ℔.	$0.15	@	$0.15½
Copper Bottoms	"	.12½	@	.13
Yellow Metal	"	.08	@	.08½
Brass, heavy	₩ ℔	.10	@	.10½
Brass, light	"	.08	@	.08½
Composition, heavy	"	.12	@	.13
Lead, heavy	"	.03½	@	.03¾
Tea Lead	"	.03¼	@	.03½
Zinc	"	.03	@	.03¼
Pewter, No. 1	"	.11	@	.12
Pewter, No. 2	"	.08	@	.09
Wrought Iron	₩ ton	17.00	@	18.00
Light do	"	10.50	@	12.00
Stove Plate	"	10.00	@	11.00
Machinery do	"	14.00	@	15.00
Grate Bars	"	....	@	5.00

The prices current for Rags, &c., are as follows:

Canvas, Linen	₩ ℔.	3½c.	@ ....
White Cotton, New	"	3½c.	@ ....
" " No. 2	"	2½c.	@ ....
White, No. 1	"	3½c.	@ 4c.
" No. 2	"	2½c.	@ ....
Seconds	"	1½c.	@ 1¾c.
Soft Woolens	"	10 c.	@ ....
Mixed Rags	"	2 c.	@ 3 c.
Gunny Bagging	"	1¾c.	@ ....
Jute Butts	"	2¾c.	@ ....
Kentucky Bagging	"	3 c.	@ ....
Book Stock	"	2½c.	@ ....
Newspapers	"	2 c.	@ ....
Waste Paper and Scraps	"	1 c.	@ ....
Kentucky Bale Rope	"	4 c.	@ ....

EXPORTS

Dutch West Indies.

	Quan.	Val.
Ptlm., gals	893	$133
Nails, bxs	29	470
Hdw., cs	13	123
Mach'y, cs	1	150
Copper, pkgs	4	260

Dutch Guiana.

Hdw., cs	2	100
Ptlm., gals	2019	307

Elsinore.

Ptlm., gals	190,868	21,000

Amsterdam.

Ptlm., gals	525,348	62,500

Bremen.

Ptlm., gals	338,950	40,674
Mf. iron, pkgs	62	764
Lub oil, bbls	483	3,928
Pltdw'e, cs	5	423
Mach'y, cs	5	500
Sew. ma., cs	2	150
Hdw., cs	22	225
Tinware, cs	2	66

Hamburg.

Ptlm., gals	250,901	23,581
Sew. ma., cs	1169	24,880
Mf. iron, pkgs	121	328
Hdw., cs	40	1,362
Pltdware, pgs	11	545
Glassware, cs	2	58
Piano mtls., cs	4	50
Belting, cs	9	2,434
Clocks, bxs	35	533
Mach'y, cs	20	3,012
Crucibles, hhd	3	88
Mach. oil, gls	98	69
Ag. imp., pkgs	3	177
Belting, cs	1	450

Rotterdam.

Machinery, cs	11	839
Mf. iron, pkgs	14	339
Burners, case	1	73
Spokes, cs	2	57
Lub. oils, bbls	260	2,856
Clocks, case	1	53
Hdw., case	1	90

Antwerp.

Ptlm., gls	1,619,142	183,930
Hdw., cs	10	110
Glassw'e, cs	1	70
Lub. oil, bbls	55	749
Sew. ma., cs	72	1,018

Great Yarmouth.

Ptlm., gals	130,026	16,903

Hull.

Ptlm., gals	120,950	14,514

Queenstown.

Ptlm., gals	168,822	19,000

Belfast.

Ptlm., gals	158,115	17,500

Malta.

Ptlm., gals	170,000	22,100

British North American Colonies.

Coal, tons	1300	5,100
Clocks, bxs	5	92
Mach'y, cs	1	72
Ptlm., gals	1500	225
Hdw., cs	2	190
Glassware, cs	11	155
Lub. oil, bbls	100	600
Retorts	2	123

British West Indies.

Ptlm., gals	42,530	6,737
Glassw'e, cs	97	608
Hdw., cs	15	251
Cge mtls., pgs	33	152
Sew. ma., cs	4	135
Nails, kegs	171	640
Glass, bxs	29	99
Carriages	3	400
Mach'y, cs	2	67
Tinware, cs	2	28
Carriage	1	150

Canada.

Glassware, cs	13	443

British East Indies.

Ptlm., gals	150,000	18,750
Carriage	1	300
Clocks, cs	4	200
Ag. imp., pkgs	55	2,000
Hdw., cs	12	500
Pltdw're, pkgs	5	510

Cette.

Ptlm., gals	122,108	9,604

Tarragona.

Ptlm., gals	160,000	17,590

British Australia.

Ag. imp., pkgs	113	5,720
Cutlery, cs	5	250
Saddlery, cs	1	80
Tacks, cs	48	692
Machy., cs	11	1,003
Muskets, cs	30	6,000
Pltdw're, pkgs	61	4,057
Glassw'e, cs	148	2,580
Burners, cs	3	227
Carriages	2	669
Mach. oil, gals	1190	607
Tinware, cs	6	280
Wringers, cs	21	843
Nails, kegs	113	453
Cge mtls., pgs	176	4,219
Machy., pkgs	338	3,920
Watches, bxs	2	360
Sew. ma., cs	442	12,980
Ptlm., gals	85,360	15,529
Lub. oil, gals	1500	890
Crucibles, hhd	6	193
Lmp. gds. pgs	124	2,374
Hdw., cs	1354	28,640

Havre.

Ptlm., gals	491,513	33,155
Machy., pkgs	7	3,833
Ag. imp., pkgs	28	2,100

Trieste.

Ptlm., gals	371,902	46,000

Salonica.

Ptlm., gls	145,000	20,000

Marseilles.

Crucibles, cks	5	84

Cuba.

Mf. iron, pkgs	378	2,593
Grindstones	200	98
Retorts	12	596
Scales, pkgs	95	650
Ptlm., gals	6600	1,260
Mf. iron, pkgs	109	3,835
Ag. imp., pkgs	21	1,665
Glassw'e, cs	24	539
Mach. oil, gals	500	346
Tubes, cs	23	41
Hdw., cs	43	93
Pumps, pkgs	[illegible]	34
Nails, kegs	50	150
Sew. ma., cs	8	245

Hayti.

Hdw., cs	18	1,045
Iron safe	1	50
Brass tubs, cs	10	1,509
Iron, pkgs	67	340
Nails, bxs	42	73
Nails, kegs	13	53

	Quan.	Val.
Machy., pkgs	198	$6,510
Tanks	5	193
Mf. iron, pkgs	324	603
Ptlm., gals	3340	532
Glassw'e, cs	44	315
Lamp gds., pgs	12	183
Zinc, cask	1	48

Mexico.

Machy., pkgs	1819	67,982
Nails, kegs	138	465
Coal, tons	20	120
Arms & am., pgs	25	2,727
Tel. mtl., cs	2	170
Hdw., cs	106	2,936
Grindstones	10	51
Glassw'e, cs	4	41
Tinware, cs	4	119
Lead pipe, pgs	13	111
Revolvers, cs	4	1,349
Tel. mtl., pgs	49	242
Steel, pkgs	2	280
Lp. gds., pkgs	11	275
Tacks, cs	9	62
Cannon, cs	3	1,500
Car mtl., pkgs	42	832
Ptg. mtl., pkgs	26	1,130
Clocks, pkgs	12	117
Mf. iron, pkgs	5	215
Cartridges, cs	6	204
Iron, bxs	2	108
Cutlery, cs	20	375
Ag. imp., pkgs	51	2,510

Central America.

Powder, lbs	400	70
Hdw., cs	23	525
Ptlm., gals	500	75
Sew. ma., cs	6	93
Saddlery, case	1	31
Rifles, case	1	31
Shot, pkgs	13	102
Cutlery, cs	6	263
Tinware, cs	5	120
Tel. mtl., case	1	60
Iron safe	1	40

United States of Colombia.

Pumps, pkgs	8	131
Ag. imp., pkgs	85	4,474
Clocks, bxs	15	358
Guns, cs	19	2,746
Pltdware, cs	4	456
Lmps, &c., pgs	17	563
Telephones, cs	2	100
Nails, kegs	28	204
Cutlery, cs	68	2,110
Tin, boxs	13	86
Watches, case	1	216
Velocipedes, cs	3	203
Brass goods, cs	1	220
Cge. mt., pkgs	27	829
Mach. oil, gals	496	215
Sew. ma., cs	102	2,723
Glassw'e, cs	30	217
Hdw., cs	98	5,090
Mach'y, pkgs	239	3,615
Mf. iron, pkgs	145	1,410
Ptlm., gals	2070	416
Cartridges, cs	410	11,724
Rifles, cs	32	7,660
Revolvers, cs	3	411
Iron, bars	97	464
Saddlery, cs	5	491
Lead, pigs	2	153
Tel. mtl., pkgs	4	30
Belting, bale	3	68

Brazil.

Ptlm., gals	107,537	14,844
Hdw., cs	83	842
Tinware, case	1	17
Mach'y, pkgs	7	440
Iron safe	1	90
Glassw'e, cs	15	77
Ag. imp., pgs	32	510
Cutlery, bxs	45	892

Venezuela.

Carriage	1	300
Hose, cs	2	160
Ptlm., gals	9900	1,608
Locomotive	1	11
Revolver, cs	1	200
Pltdware, cs	1	40
Machy., pkgs	40	691
Hdw., pkgs	40	282
W. closets, cs	2	50
Hdw., cs	69	806
Clocks, bxs	2	29
Sew. ma., cs	5	97
Glassw'e, cs	1	37
Nails, bxs	26	516
Tel. mtls., pgs	3	190
Nails, kegs	4	33
Cartridges, cs	1	50
Lamps, pkgs	6	60

Argentine Republic.

Hdw., pkgs	330	6,122
Lp. gds., pkgs	4	124
Brass, pkgs	149	9,893
Watches, case	1	80
Tacks, cs	20	110
Sandpap'r, cs	12	290
Glassw'e, cs	41	728
Pltd. ware, cs	2	50
Ag. imp., pkgs	73	1,680
Saddlery, cs	2	206
Clocks, bxs	52	2,111
Tinware, cs	10	314
Brass g'ds., cs	3	125
Sew. mach. cs	80	1,425
Carriages, cs	1	50

China.

Rifles, case	[illegible]	113
Sew. ma., cse	1	75
Cartridges, cs	2	46
Guns, case	1	85
Machy., pkgs	14	750
Ag. imp., pkge	1	75
Hdw., cs	4	142

Liverpool.

Belting, cs	3	558
Ptg. mtls., pgs	7	280
Mach'y, cs	44	3,524
Watch mtls., cs	1	1,000
Clocks, bxs	63	4,430
Sew. ma., cs	55	803
Pltdw're, pgs	10	1,068
Lp. gds., pkgs	35	3,703
Pumps, pkgs	4	240
Hdw., pkgs	132	5,790
Lub. oil, bbls	598	5,160
Ptlm., gals	412,100	51,502
Rifles, cs	50	11,400
Metal g'ds., cs	2	350
Ag. imp., pkgs	18	900

Glasgow.

Machy., cs	5	800
W. wheel	1	293
Hdw., cs	3	74
Primed shell, cs	21	438
Mf. iron, pkgs	4	349
Metal, case	1	200
Belting, case	1	435
Ag. imp., pkgs	2	216
Cartridges, cs	2	41

London.

Hdw., cs	301	7,571
Clocks, bxs	305	5,620
Steel, case	1	50
Billets, cases	39	246
Mach'y, cs	59	7,975
Shells, cs	11	800
Tel. mtl., pkgs	20	1,500
Sew. ma., cs	27	810
Ag. imp., pkgs	54	1,584
Mf. iron, pkgs	28	464
Rifles, cs	8	2,056
Glassw'e, cs	20	171
Wringers	3	148

IMPORTS

Of Hardware, Iron, Steel and Metals into the Port of New York, for the Week ending October 25, 1880 :

Hardware.

Boker Hermann & Co.
Cases, 32
Casks, 3
Pkgs., 82
Drexel, Morgan & Co.
Anvils, 80
Chains, cks., 2
Ironware, cs., 2
Degraw, Aymer & Co.
Chains, pkgs., 7
Field Alfred & Co.
Per. caps, cs., 26
Cases, 8
Casks, 2
Mdse., pkgs., 5
Folsom H. D.
Mdse., pkgs., 7
Graef Cutlery Co.
Cutlery, cs., 8
Hartley & Graham,
Guns, cs., 1
Mdse., pkgs., 2
Moss, F. W.
Files, cks., 3
McKinness, H. A.
Casks, 2
McCoy & Saunders,
Casks, 4
Cases, 6
Cutlery, cs., 1
Mount, J. T.
Pkgs., 3
Merchants Dis. Co.
Guns, cs., 10
Peters Bros.
Mdse., pkgs., 3
Planque, E. De
Cases, 10
Pim, Forwood & Co.
Pkgs., 71
Rogers, H. A.
Cases, 2
Schoverling, Daly & Gales
Cases, 13
Steglich & Baese,
Whetstone, cs., 6
Winchester Arms Co.
Guns, cs., 2
Witte J. G. & Co.
Mdse., pkgs., 13
Wiebusch & Hilger
Hdw. Co,
Cutlery and hdw., pkgs., 57
Order,
Guns, cs., 9
Cases, 13
Pkgs., 35
Files, casks, 25

Iron.

Bank of New York,
Hoops, bdls., 18981
Bank of Nevada,
Scrap rails, 2669
Baring Bros.
Bars, 1693
Hopkins, E. T.
Bundles, 882
Justice, P. S.
Wire rope, coils, 1
Kenanth, Macleod & Kuhne,
Mach'y, pkgs., 69
Lang W. Bailey & Co.
Bars, 472
Lundberg Gus,
Bars, 5175
Coils, 271
Moore's J. B. & Co.
Bars, 1954
Coils, 789
Mason, J. W.
Wire rope, coils, 4
Naylor & Co.
Spiegel, lots, 2
Spiegel, tons, 428⅛
Maitland, Phelps & Co.
Scrap tons, 1
Patterson, Reid & Co.
Mach'y, cs., 2
Stroud, W. L.
Hoop, bdls., 2130
Tillottson L. G. & Co.
Gal. wire, lots, 273
Williamson Jas. & Co.
Pig, tons, 300
Order,
Ore, tons, 2755¾
Spiegel, tons, 1844
Scrap, tons, 27⅓
Ferromanganese, cks., 158
Sheet, pkgs., 2158
Scrap rails, tons, 63⅓
Bars, 5353
Rails, 7052
Mach'y, cs., 14
Rods, bdls, 794
Hoops, bdls., 5994
Scrap, bars, 3024
Wire, bdls., 371
Sheet, bdls., 134
Pig, tons, 3662
Scrap rails, 3870

Steel.

Abbott, J. & Co.
Cases, 92
Baltner & Leitchenstein
Rails, 4041
Bank of British North America,
Steel rails, 4220
Carey & Moen,
Casks, 3
Bundles, 1
Wire rods, bdls, 269
Fargo & Co.
Plates, cs., 2
Frasse & Co.
Wire, cs., 1
Moss, F. W.
Bundles, 49
Bars, 9
Mayer, Strauss & Co.
Casks, 34
Merchants Dis. Co.
Bundles, 40
Prosser, Thos. & Son,
Bands, 110
Temple & Lockwood,
Bars, 5
Pkgs., 94
Woodford, W. O.
Bundles, 214
Bars, 28
Cases, 6
Order,
Cases, 29
Casks, 26
Bundles, 195
Wire, 115
Rail tons, 1000

Metals.

Brown, V. H. & Co.
Tin plates, bxs., 2092
Coddington, F. B. & Co.
Tin plates, bxs., 271
Dickerson, Van Dusen & Co.
Tin plates, bxs., 889
Montell, F. T. & Sons,
Scrap, bdls, 3
Meyer, Moritz
Lead, bars, 3302
Osborn, John, Son & Co.
Scrap brass, tubes, 34
Pope, Cole & Co.
Copper, bars, 214
Phelps, Dodge & Co.
Tin plates, bxs., 6669
Black taggers, bxs., 150
Order,
Tin plates, bxs., 14,895
Tin, ingots, 600
Black copper, pigs, 170
Antimony, cks., 80

COAL.

Trade during the past week has not been materially different from that of the week before. While every one is busy filling orders, and, so far as possible, taking care of the Coal coming down, there are some who complain that new orders do not come in with the rapidity that is desirable. Others report that they have all that they can do to fill the orders that are now coming in.

From one party we hear that the manufacturing sizes are somewhat slow, and that in consequence they are breaking up their larger sizes into stove, &c., and so disposing of their surplus which they would otherwise have. On the other hand, we find dealers who say that an increased demand, especially from the East, has recently sprung up. These gentlemen say that the Eastern market is pretty bare of Coal, and manufacturers, seeing that freights have come down to reasonable figures, are coming in and taking Coal as they can get it. It may be said in explanation that the hard coals in the large sizes are still scarce, and it is reported that orders cannot be placed for them. The domestic Coals are in good demand, especially in and about the city, where the retail trade is brisk. The Coal papers are encouraged that there is no weakening in the market and because prices are firm, and we think they have good cause to be. One of the last tonnage reports shows that the output for the last week reported was no less than 684,000 tons. This is an increase of nearly 100,000 tons over the same week last year. Prices are unchanged. The harder coals are firm at the circular rates. Free-burning stove, though quoted at $4.45, is selling at $4.25, and the other sizes in about the same proportions. Lehigh Lump is quoted at $5 @ $5.40; Grate and Egg, $4.40; Stove, $4.45, and Chestnut of all kinds, $4 @ $4.15; Free-burning, Lump and Grate, $4; Egg, $4.10 @ $4.20; Stove, $4.35. Freights are unchanged, with Boston quoted at $1.20. Sound freights are about 5¢ off, with New Haven at 65¢ @ 70¢, and Providence, 85¢ @ 90¢.

PHILADELPHIA.

Office of *The Iron Age*, 220 South Fourth St., Philadelphia, October 26, 1880.

Pig Iron.—The market continues in a dull and unsettled condition, prices and opinions being almost as varied and as numerous as the brands offered for sale. Some parties are firmer in their views, and are selling more Iron and at higher prices than was possible two or three weeks ago. This is specially the case with the best descriptions of Foundry Iron, which have sold freely at $25 to $26, and are not in large supply even at top figures. Others are offerring at $24 and less, without securing much business at the lowest quotations. The wide difference in prices can only be attributed to the determination of consumers to use none but good Iron and such brands as they have been accustomed to use. Hence, some Irons of good quality are offerred at $2 per ton reduction or more, and not taken, simply because the working quality is not understood, and there is no disposition to try experiments. Consumers have plenty of work on hand at fairly renumerative prices, and they want good iron, and for something they know all about, price is not of so much consequence as formely. As compared with last week, there seems to be a slight improvement in Foundry Irons; at any rate favorite brands are inquired for more urgently, and holders ask full prices, and in some cases a fractional advance. These remarks do not apply to lower grades, however, which are dull and very irregular. No. 2 Foundry has been sold at $21 @ $22, and Forge Iron at $19 @ $20, the latter, when known, sells fairly at full prices, but a good deal of iron has been offered at very low prices without finding purchasers. Notwithstanding this irregularity in prices and the undoubted large production, it is not likely that stocks are accumulating to any extent, the increase in consumption being probably equal to imports and production combined. Average prices realized during the week have been as follows: No. 1 Foundry, $25; No. 2, $22; Gray Forge, $20, with occasional sales at $1 higher, others at $1 lower, according to character of Iron; Charcoal Iron, $35 @ $38; Bessemer nominal at $25. Scotch Iron, $21 @ $24, according to brand. Eglinton sold down to $20.50; Gartsherrie, $24.

Muck Bars.—The market has not changed, and $38 @ $39, at mill, seems to be the current rate. Sellers are offering freely at the higher figure, but buyers are unwilling to pay more than $38, at which a moderate amount of business has been done.

Blooms.—Holders of the best brands claim to be getting $67.50 @ $70 for Charcoal Blooms, but for round lots good buyers can possibly supply their requirements at last week's prices, viz.: Cold-Blast Charcoal Blooms, $65 @ $67.50 per ton of 2,464 lbs.; Run-out Anthracite, $55; Sunken Scrap Blooms, $50 per ton of 2240 lbs.; and Northern Ore Blooms, $45.50 @ $47.50.

Structural Iron.—There is no change of any importance. The demand for small lots is active and about equal to the output. Inquiries are numerous, and indicate an abundance of work during the winter months. Several large contracts are under negotiation, and the outlook is entirely satisfactory. Angles may be quoted at 2.6¢ @ 2.7¢; Beams, 3¢; Channels and Tees, 3.1¢ @ 3.2¢.

Plate and Tank Iron.—There has been a good deal of inquiry during the week and sales to a moderate amount, but prices are irregular and in some cases lower. Prospects are good for an active winter's work, and better prices have been looked for, and a week ago were confidently predicted, but competition on new orders has been so close as to effectually prevent any real improvement. The mills are very full of work, however, and as ship building is likely to become active during the winter, some advance is quite probable. In the meantime quotations are about the same as last week, viz.: Tank Iron, 2.75¢ @ 2.87½¢; C. No. 1, 3.3¢; C. H. No 1, 3.5¢; Flange Iron, 4¾¢ @ 5¢; Fire Box, 5¾¢ @ 6¢.

Sheet Iron.—The demand is fair, and a full average business is being done at unchanged prices. Stocks in manufacturers' hands are pretty well exhausted, and it is expected that consumption during the season will absorb stocks now carried by dealers. Small lots may be quoted as follows:

Common Sheet, No. 26 to 28	4¼¢
Common Sheet, No. 22 to 25	4½¢
Common Sheet, No. 16 to 21	4¾¢
Best Refined ¼¢ @ ½¢ advance on the above.	
Best Bloom Sheets, No. 26 to 28	7¼¢
Best Bloom Sheets, No. 22 to 25	7 ¢
Best Bloom Sheets, No. 16 to 21	6¾¢
Common Red Plates, 3-16 to 16	3.4¢
Blue Annealed, 3-16 to 16	3.5¢
Best Bloom Galvanized, discount	30 %
Second quality, discount	40 %

Bar Iron.—There is no change whatever. Prices are steady, the demand fair and prospects quite encouraging. Manufacturers complain that new orders are scarce, but most of them are running full time, and it is certain that consumption is fully maintained. It is quite likely that orders are being held back until after the election, but not at all probable that anything will be gained by the delay. The mills are fairly off for orders, and any increase in the demand will tend to strengthen prices, as there is very little margin at current rates; in fact, it is the general opinion that, in the present condition of the market, neither manufacturers nor dealers have a tenth of a cent profit. A good deal of stress appears to be laid on the election, and if business does not improve after it is over, there will be disappointment all around. Sales during the week have been moderate in amount and at about last week's prices. The nominal rate is 2.4¢, at mill, but for large lots concessions have been made, market closing steady.

Steel Rails.—The market seems to be a shade firmer, and $60 an inside rate for early deliveries. For immediate delivery higher prices would have to be paid; in fact, it would be difficult to place an order of any amount unless for next year's delivery. Sales of two or three lots, aggregating 20,000 tons, have been closed during the week at $60 at mills on the lakes. Other business is under negotiation for delivery in the same section of country, and several heavy orders are expected to be placed there in course of the next 30 days. The Pennsylvania mills are so loaded with orders that they are almost out of the market, and are not quoting unless to roads in their immediate vicinity. No change in price seems probable, unless in sympathy with foreign markets, which from the most recent advices appear to be somewhat weak. About $60 at mill for American may be considered a fair quotation, and for foreign Rails same figure at tide.

Iron Rails.—The market is firm, without much business being done. Manufacturers find it impossible to turn out Rails at less than $46 with any margin for profit, and are, therefore, standing out for that as a minimum figure. Foreign Rails can be laid down at lower figures, so that for some deliveries, East, South and Southwest particularly, nearly all the business is going abroad. There are inquiries in to-day for lots amounting to about 12,000 tons, most of which will probably be given to Pennsylvania mills. Local and Western business appears to be all that ironmasters bid for, the difference in freight enabling them to compete with foreign manufacturers. Sales of light Rails have been made at $48 @ $50, according to section, and 56's are firmly held at $46.

Old Rails.—The market is exceedingly dull, and business of importance cannot be done unless at some concessions in price. There is no disposition to purchase unless to cover sales of new Rails, which, for some time past, have been very trifling. We hear of lots in store being offered at $25.50, but $26 @ $26.50 is the usual asking price, and the business done has been at from $25.50 @ $26. The market is heavy, and consumers show no disposition whatever to anticipate their requirements.

Railway Supplies.—The demand is very satisfactory, but prices are a shade easier, and we hear of sales being made at 10¢ @ 15¢ below the usual asking rates, which are as follows: Spikes, $2.75; Fish Plates and Splice Bars steady at 2.4¢ @ 2 5¢; Track Bolts, $3.75 @ $4.50, according to specification.

Scrap Iron.—The market is irregular and scarcely as firm as last week. Short Scrap sells at $25 @ $26.50; Long at $27 @ $28; Machinery at about $20, and Stove Plates, $16.

Nails—Very irregular, and cannot be quoted with any degree of exactness, although $3 is the usual asking price.

PITTSBURGH.

Office of *The Iron Age*, 77 Fourth Avenue, Pittsburgh, Pa., Oct. 26, 1880.

Trade in all its varied departments is keeping up well, considering the political excitement, and then the long-continued suspension of river navigation has its effect here in Pittsburgh. As noted in our report of last week, there is a decidedly better feeling since the October elections. After the battle of next Tuesday, and the excitement attending it has subsided, our manufacturers generally look for a largely increased business, as orders that have been held back will then be sent forward, although there is no doubt that a great deal of work held back to await the result of the election will have to go over now until next summer. The demand for iron, in the meantime, will not be as large as it would otherwise have been. From now until next May there will be but little out-door work done in the Western country, but the outlook is favorable for a good business for the season, and our manufacturers, as a rule, are very hopeful of the immediate future. One of the most encouraging features of the times is that business is being conducted on a healthy and legitimate basis; there is an absence of the spirit of overtrading, which was so prevalent a year ago, and, as will be remembered, resulted so disastrously.

Pig Iron.—There has been an increased volume of business during the past week, and while prices remain unchanged, there is a better and more confident feeling. It is evident that some consumers are apprehensive of a "spurt" after the election, when, in view of the fact that the mills have been drawing upon their stocks for several weeks past, a largely increased demand is confidently expected; hence, they are anxious to anticipate future wants, and are taking all the desirable lots that can be obtained at bottom prices. The consumption here in Pittsburgh has been unusually large this fall, every available puddling furnace having been in full blast for several months; some of the mills that have been carrying the largest supply of the raw article are almost out, and it is very evident that they will nearly all be obliged to buy more or less before long. This being the case, it is not strange that consumers are apprehensive of an advance, and are buying all they can obtain that is offered at anything of a bargain. There has been considerable Iron sold during the past week or two of which no report was made, having been suppressed either at the instance of the buyer or seller, and the increased inquiry and sales have, as might be expected, produced a more confident feeling. Some mill owners are anticipating future wants, as they are apprehensive that, in the event of an increased demand, higher prices may follow. Forge Irons may be quoted as follows: $20 @ $21, 4 mos., for Cold short; $22 @ $23 for Neutral; $23 @ $24 for cinder-mixture Red-short; $25 @ $26 for all ore ditto, and $27 @ $28 for Bessemer. We can report a sale of 1000 tons Neutral at $22.50, 4 mos.; Foundry grades, $23 @ $25 for Nos. 2 and 1.

Manufactured Iron.—Some mill owners report a slight improvement in the demand, while others make a different statement, but all agree that there is a more cheerful feeling. There is reason to believe that many large orders have been held in abeyance in consequence of the Presidential struggle, and the work of outdoor construction having been delayed until the fine weather has passed, will have to go over now until next spring; but the work of getting the material can be pushed forward in the meantime, and it is probable that some large contracts for bridge and architectural purposes will be placed within the next few weeks. Merchant Bars may be quoted at 2.15¢ @ 2.25¢ rates, 60 days, 2 % off for cash; Sheet, 4¢ @ 4.10¢ for No. 24; Skelp, 2.30¢ @ 2.40¢; Plate and Tank, 3¢ @ 3.25¢; Hoop, 3¢ @ 3.20¢.

Nails.—The market continues dull, as it usually is at this season of the year, and it is not likely that there will be any change for the better until January or February, when orders for the spring trade will commence to come forward. Some of the factories are still in operation, but they are working on old contracts or "piling up," as there are very few fresh orders coming forward. Prices are irregular, and, while the card remains unchanged, sales are being made as low as $2.65 @ $2.75, net cash.

Railway Supplies.—Steel Rails, in the absence of sales, are quotable at $60 @ $65, cash at mill, according to time of delivery. The mill here is said to be sold up until next summer, and it is very difficult to place an an order for delivery this year at any price, as the mills are all oversold. Railway Spikes, 2.65¢ @ 2.75¢, 30 days; Fish Bars, 2.25¢; Track Bolts, 3½¢ with Square and 4¢ with Hexagon Nuts.

Wrought Iron Pipe.—This branch of the Iron business has been an exception to the rule, as there has been scarcely any abatement in the demand. The mills have been, and are still, very busy, and this is almost certain to be the situation until the close of the year. Prices firm but unchanged, 60 @ 65 % off regular card; Boiler Tubes, 40 % off. Oil Well Casing is still quoted at 70¢ @ 75¢ ℔ foot, net; and do. Tubing, 21¢ ℔ foot, net.

Steel.—Manufacturers generally report that orders have been light for some weeks past. Prices, as is always the case when there is a falling off in the demand, are easier, but so far as we can learn there is no more cutting than ordinarily. Desirable orders from large buyers can, as a rule, be placed at from ½¢ to 1¢ ℔ lb under card rates.

Muck Bar.—There have been no sales reported for a considerable time, in the absence of which we quote $39 @ $40 ℔ ton, cash, at mill.

Scrap.—There is a more confident feeling, and an increased business is looked for within the next few weeks, as consumers generally have light stocks and will be obliged to go on the market before long. Sales of No. 1 Wrought Scrap have been made within the past week at $28 ℔ net ton, and this figure for the time appears to be the top of the market. Old Car Springs and Axles nominal at $35 @ $36 ℔ net ton; Old Car Wheels, in the absence of sales, $32 @ $33 ℔ gross ton.

Window Glass.—While orders have fallen off recently, manufacturers generally still have about all they can do. No change in card or discounts for some time past. It is claimed that the margin for profit at current rates is small, and, owing to the competition with French Glass, there is no chance to advance prices.

Coke.—Business is restricted somewhat by the difficulty in obtaining rail transportation; operators generally report that they are unable to obtain as many cars as they would like to have; the railroads here are all crowded with business. The improvement in the Pig Iron outlook will no doubt stimulate the Coke market, as it will cause an increased demand, but prices remain as last quoted—$1.40 @ $1.50 per ton, free on on cars at ovens.

Coal.—Railway operators are all very busy, as they usually are at this season of the year, and prices are firm in consequence. The continued suspension of river navigation tends to increase the business of the railway mines, although the down river markets are reported as having stocks of Pittsburgh Coal sufficient to last them from 60 to 90 days yet. The mines on the Monongahela are not doing much for want of empty craft. The prospect at the present writing is that there will be a freshet before long, as there usually is about this time.

Petroleum.—There has been very little change in this important article during the past week. Business, legitimate as well as speculative, keeps up very well, but prices to the producer continue unremunerative, and it is not reasonable to look for much, if any, improvement while the production continues so largely in excess of the consumption, as is the case at present. As regards refined there is nothing new or important to note; there is a steady demand for home consumption, but there is very little being made here for export.

CHATTANOOGA.

Office of *The Iron Age*, Market and 8th Sts., Chattanooga, Oct. 25, 1880.

Trade, especially in crude material, has had a boom during the week just closed. Foundries and mills had used their stocks down to the smallest proportions, and have been ordering from every direction in liberal quantities. A large number of orders from the South and West remain over to be filled. Of course there is no falling off in rates for any kind of goods when material is in such request. The streams are too low for ready and profitable boating.

Pig Iron.—Stocks of No. 1 Foundry are exhausted. Neither dealers nor furnacemen hold any on hand. Several small orders remain to be filled. No. 2 Foundry and No. 1 Mill are also scarce. Prices are strong at last quotations. We quote: No. 1 Foundry, $25 @ $27; No. 2 Foundry, $23 @ $25; Gray Forge, $20 @ $22; White and Mottled, $18 @ $20; Car Wheel Metal, $40 @ $45.

Miscellaneous Articles.—Old Rails continue in liberal supply. Track renewals are being pushed on all the roads. We continue to quote at $22 @ $26; Wrought Scrap, $20 @ $24; Cast, $15 @ $17; Old Wheels, $28 @ $30.

Ores.—There has not been a perceptible change in Ores for some time. Nearly all the furnaces depending on the market are on supplies contracted for in 1879. We quote: 50 % Brown Hematite, per ton, $2 @ $2.75; Red Fossil, $2 @ $2.25.

Nails—Are strong at 3.25 rates; usual discount on 200-keg lots and for cash.

Manufactured Iron.—All finished articles rule steady. We quote: Bar, $2.40; Railroad Spikes, $3; Track Bolts, $4; Trestle Bolts, $4.50; Fish Plate, $2.50. Bar is stiff at quotation.

Coal.—The only difficulty in the Coal market is in lack of transportation to meet the capacity of mines now worked. We quote run of mine at $1.65 @ $1.75 at mills; Lump, 12¢ @ 15¢ at yard.

Coke.—Furnace Coke, $3 per ton at furnace; Foundry, 10¢ @ 12¢ per bushel.

Steel and Iron Rails.—Steel Bars have slightly strengthened and are quotable at $62.50 for American makes, $60 for foreign. Iron, $48 @ $50; Small T is firm at $55. Southern mills are full of orders for 60 to 90 days ahead.

Lead.—We quote: Pig Lead, 4½¢ @ 5¢.

Steel.—Plow Slabs, 3 in. and under, $4.70; Black Diamond, ordinary sizes, 13¢.

CLEVELAND.

October 25.—The market for metal has shown more life than for some time past, consumers showing a disposition to take considerable quantities, and concessions of 25¢ @ 50¢ per ton under prices named in last week's report. It is fair to state, however, that the buying comes from those who are sanguine of Republican success next month. In anthracite Irons the transactions have taken place on basis of $25, a shade under 4 mos., for No. 1; $23, 4 mos., for No. 2, and $21, 4 mos., for Forge. In Bituminous metal from Lake Superior Ores there have been considerable contracts closed at prices ranging from $22, 4 mos., for Cinder Mixed, to $24, 4 mos., for all ore. In Bessemer Pig for Bessemer purposes we hear of no actual business, but considerable inquiry, and we hope by another week to note sales of this grade. In Charcoal Lake Superior Pig the buying is and has been quite steady for some time, prices ranging about $34 for No. 1, and $37 @ $40 for the Car Wheel and Malleable grades.

There is no change to note in the market for Iron Ores. The call for ores suitable for fixing is the chief inquiry, and the supply is at present barely equal to the demand. The call from furnaces is confined to ores for making red-short Mill Irons. Prices same as our last.

BOSTON.

October 23.—The demand for raw Irons has been only of moderate proportions, but the *Bulletin* noted that there appeared to be a little more confidence at the close of last week, and the recent tendency toward lower prices appears now to have been checked. Buyers themselves have this impression, but have not yet obtained sufficient confidence to operate freely. But there has been a large and steady consumption of Iron in the midst of the dull trade of the last two months, and supplies in the hands of consumers cannot be large as a rule. We quote *American Pig Iron*, at $25 @ $26 for No. 1 X; $20.50 @ $21.50 for No. 2 X, and $19 @ $20.50 for Gray Forge. These prices are f. o. b. at the port of shipment. Small spot lots will command $2 per ton higher. Freights on pig Iron from New York to Boston are $1.35 @ $1.40 per ton. *Foreign Pig* is also steadier and in better demand. We quote: $21 @ $22 for Eglinton; $22 @ $23 for Glengarnock and Gartsherrie, $24 @ $25 for Coltness and Langloan. We quote English Pig Iron at $20 @ $21 for No. 1 Clarence and $19 @ $20 for No. 3 ditto. *Old Rails* continue dull and nominal at $28 @ $30 for American and $25 @ $27 for foreign. *Manufactured Iron* is in moderate demand from the stores, and prices are without much change. Nails have been somewhat weak of late, and there has been some disposition to cut prices. We quote Bars at $2.35 for Best Refined, and $2.20 for Common. We quote Norway at $4.15 for Bars and $5.15 for Shapes; Nails at $3.15 per keg. Plates at 3¼¢ for Tank, 3½¢ for C. No. 1, 3¾¢ for C. H. No. 1 Shell, and 4¾¢ @ 5¢ for C. H. No. 1 Flange. *Copper* has shown no change and continues quiet and fairly steady at 18¾¢ @ 18⅞¢ for round lots of Lake, and 18¼¢ @ 18½¢ for Baltimore. Buyers are not yet disposed to operate with any degree of freedom. A moderate jobbing trade prevails at 19¢ @ 20¢ for Lake and 18½¢ @ 19¢ for other brands. There has been no change in the combination prices of Manufactured Copper. We quote: New Sheathing Copper, 26¢; Braziers', 28¢, and Bolts, 28¢; Bottoms, 31¢; American Yellow Sheathing Metal, 17¢ @ 18¢; Yellow Metal Bolts, 20¢, and English Yellow Metal Sheathing, 14¢, in bond. *Lead* continues dull and rather nominal at 4⅞¢ for large lots. Smaller parcels sell from store at 5¼¢ @ 5½¢. The prices of manufactures are unchanged, as follows: Bar, 6½¢; Pipe, 6½¢; Sheet, 7¢; Tin-lined Pipe, 15¢; Tin Pipe, 40¢; all less 10 % to the trade. No. 1 Solder, 11½¢. *Spelter* continues slow of sale and we quote 5¢ @ 5¼¢ for Western, and 4¾¢ @ 5¢ for Remelted. Retail lots command ¼¢ above these figures. *Tin* has been active and higher on the other side of the water, but the market here has refused to respond, and we continue to quote Straits dull and nominal at 19⅞¢ @ 20¢. Retail lots command 20½¢ @ 21¢. *Tin Plates* have been dull and tending downward. We quote large lots as follows: Charcol Tin—Melyn grade at $6.25 @ $6.50 for I. C., and $8.25 for crosses; Allaway grade at $5.87½ @ $6 for I. C., and $7.50 @ $7.75 for crosses. Charcoal Ternes at $5.25 @ $5.50 for Dean grade, I. C. 14 x 20, and $11 @ $11.50 for ditto ditto 20 x 28. Coke Tin at $5 for B. V. grade I. C. Coke Ternes at $5 for 14 x 20 and $10.25 @ $10.50 for 20 x 28.—*Commercial Bulletin.*

CINCINNATI.

October 25.—The Pig Iron market is very quiet; sales during the past week have been confined to car-load lots and to meet the immediate wants of smaller consumers. This class of trade consumes very largely of the production in this region, hence the accumulation is not large. Prices are firm and quotable as follows:

Hanging Rock Charcoal Hot-blast Foundry, 4 months, f. o. b.	$27.00 @ 27.50
Hanging Rock Charcoal Cold-blast "Car Wheel"	38.00 @ 42.00
Hanging Rock Coke Foundry	26.00 @ 26.50
Hanging Rock Stonecoal Foundry, No. 1	24.00 @ 24.50
Hanging Rock Stonecoal T. G. "Softeners"	22.50 @ 23.50

No transactions in Forge Irons to justify quotations. *Manufactured Iron.*—Mills are well supplied with orders and prices very firm at $2.25 and $2.30, card rate.

LOUISVILLE.

Messrs. Geo. H. Hull & Co., Commission Merchants, report to us as follows, under date of October 22: There is more inquiry for Iron during the last few days, and some considerable sales have been made, but prices are lower than two weeks ago. We quote for cash as follows.

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal	$28.00 @ 29.00
No. 2 " "	27.00 @ 28.00
No. 1 Southern, Charcoal	24.00 @ 26.00
No. 2 " "	23.00 @ 24.00
No. 1 Hanging Rock, Stonecoal and Coke	24.00 @ 25.00
No. 2 Hanging Rock, Stonecoal and Coke	23.00 @ 24.00
No. 1 Southern, Stonecoal and Coke	24.00 @ 25.00
No. 2 " "	22.00 @ 23.00
"American Scotch"	23.00 @ 25.00
Silver Gray	22.00 @ 24.00
Scotch	28.00 @ 29.00

MILL IRONS.

No. 1 Stonecoal and Coke, Cold-short and Neutral	21.50 @ 22.00
No. 2 Stonecoal and Coke, Cold-short and Neutral	20.50 @ 21.00
No. 1 Missouri and Indiana Red-short	26.00 @ 27.00
White and Mottled, Cold-short and Neutral	18 00 @ 19.00

CAR WHEEL AND MALLEABLE IRONS.

Hanging Rock, Cold-blast	35.00 @ 42.00
Alabama and Georgia, Cold-blast	35.00 @ 40.00
Kentucky, Cold-blast	35.00 @ 40.00

NEW ORLEANS.

Messrs. MINNIGERODE & Co., dealers in Railway Supplies, 61 St. Charles street, write as follows under date of October 22: Since our last report the market has developed no material changes, for while prices may be regarded as a shade lower, several considerable lots of Old Rails and Pig have been moved at satisfactory prices. The general outlook for business is very good and merchants feel encouraged proportionately. The large increase of the grain movement down the Mississippi (the shipments for the first nine months of 1880 being double those of the entire year of 1879) will add greatly to our ocean tonnage, and will secure cheaper ocean freights on importations of every character. We quote railway track supplies as follows: Spikes, $2.75; Fish Plates, $2.25; Track Bolts, $3.50; Iron Rails, standard sections, $46 @ $48; Steel Rails, $60 @ $62. Scotch Pig from yard is selling at $27 @ $29, according to brand, and is in fair demand. Old Rails are held at $28. Wrought Scrap, $25. Cast, $18 @ $20. Old Wheels, $30, gross, f. o. b.

ST. LOUIS.

Messrs. CARD & HOFFER, Pig Iron and Iron Ore Merchants, 417 Pine street, write us as follows, under date of October 23: There has been some few sales during the past week, but none of any moment. Consumers are still buying only for immediate necessities. The following about represents the cash prices of Iron here:

HOT BLAST CHARCOAL.

Missouri	$27.00 @ 28.00
Southern	25.00 @ 27.00
Hanging Rock	29 00 @ 30.00

COKE AND COAL.

Missouri	27.00 @ 28.00
Southern	24.00 @ 26.00
Ohio	25.00 @ 27.00

MILL IRONS.

Cold-short	22.00 @ 23.00
Red-short	24.00 @ 25.00

CAR WHEEL AND MALLEABLE IRONS.

Missouri	30.00 @ 35.00
Southern	35.00 @ 40 00
Ohio	38.00 @ 45.00

ORE.—Nominal.

Ore for fix	10.00 @ 12.00
For furnace	6.50 @ 7.50
Brown Hematites	no market.

BALTIMORE.

W. N. WYETH, Iron and Steel Merchant, 46 and 48 South Charles street, reports us the following, under date of October 25: Trade for the past week has ruled somewhat quiet, owing to the near approach of the Presidential election and the uncertainties attending same; otherwise matters remain unchanged.

Ref. Bar Iron, 1 to 6 by ⅜ to 1	₩ lb	2½	@ 2¾¢
" " 1 to 4½ by 1½ to 2	₩ lb	2½	@ 2¼¢
" ¾ to 2, Round and Square	₩ lb	2½	@ 2¾¢
Hoop Iron, 1¼ wide and upward	"	3½	@ 3½¢
Band Iron, from 1¼ to 4 in. wide	"	3	@ 3½¢
Horse-shoe Iron	"	3¾	@ 4 ¢
Norway Nail Rods	"	6¼	@ 6½¢
Black Diamond Cast Steel	"	13½	@ 14½¢
Machinery Steel	"	9	@ 9½¢
Cast Spring Steel	"	8	@ 8½¢
Common Horse Nails	"	10	@ 14 ¢
Perkins' Horse shoes, ₩ keg of 100 lbs			$4.37½
" Mule shoes			5.37½

	10	9	8	7	6
Putnam Horse Nails ₩ lb	21	22	23	24	26¢
Globe Horse Nails ₩ lb	20	21	22	23	25¢
Railroad Spikes			3	@	3¼¢

Less list discount to the trade.

RICHMOND.

Mr. ASA SNYDER, Iron Merchant and Furnace Agent, writes as follows under date of October 25: A fair business doing, but mostly in a small way. No change in quotations.

Scotch Pig Iron	$24.00 @ 27.00
American Scotch Pig Iron	28.00 @ 29.00
No. 1	26.00 @ 28.00
No. 2	21.00 @ 24.00
No. 3	20.00 @ 22.00
Mottled and White	19.00 @ 20.00
Virginia Charcoal Wheel Iron	36.00 @ 40.00
Old Rails	25.00 @ 28.00
Wrought Scrap, No. 1	23.00 @ 24 00
Cast, Machinery Scrap	21.00 @ 22.00
Richmond Refined Bar Iron	2.6 @ ....
Horse Shoes, Tredegar	@ 4.00
Mule " "	@ 5.00
Old Dominion Nails	@ 3.25

For lots of 200 kegs, 10¢ per keg less.

Last week's quotations of Nails should have been $3.25 instead of $3.

Our English Letter.

Review of the British Iron, Steel, Metal and Hardware Trades.

(From our Regular Correspondent.)

LONDON, ENG., October 11, 1880.

THE IRON MARKET

is in no sense lively, the whole of the week now ending having been characterized by remarkable quietness. This is not infrequently the case during the penultimate week of the quarter, but it is probable that in recent years scarcely any such period has been dull er and more fraught with hesitating uncertainty that the one under notice. You are already well aware of the leading facts which have been current of late, so that I need not attempt to recount them in detail here. Venders seem to be ignorant of their own position, and buyers have held back in the belief that by so doing circumstances would rule in their favor even more strongly than at present. In the open market exceedingly little business has been done in any direction, and quotations have been irregular to an extent not lately observable. As regards crude irons this lax state of affairs has been general throughout the whole of the principal ironmaking districts, and prospects have looked so exceedingly gloomy that the smelters have felt universally "down on their luck," and have vainly tried to tempt fortune by more or less considerable concessions. In adopting this course the majority of the furnace owners have probably been largely influenced by the example set in Scotland, the Glasgow market having been more or less stale, flat and unprofitable throughout the six day's operations. As is set forth elsewhere, warrants have been dull at from 49/ to 50/, and makers' brands have been, and are, quoted at nominal figures, the amount of good business done being infinitesimal. More furnaces have been restarted since I last wrote, and the production is rapidly approximating to that of the antestrike period. The reserve stocks continue to increase, and the quantity of pig iron piled up in Connal's warehouses and in makers' own yards begins to merit the epithet "enormous." Despite this obvious excess of the production over the demand the output is fully maintained, and producers are stated to be permeated with the belief that they cannot do wrong in making iron with ores, fuel and wages at their existing low levels. This conviction supplies the key to their persistent action, but I think it is at least doubtful whether they are quite wise in following it out to such extremes. Scotch pig may in the past have always been saleable at about 50/, but under the altered conditions and enormously increased competition of the present day, it is possible that 45/ may represent the average price obtainable in a normal state of trade. Whether this is true or not, however, time alone will show. In the meantime the Scotch ironmasters undoubtedly cherish a strong hope that they will again and shortly find a good demand for their brands from the United States. All the known facts and recognized opinions are dead against the realization of this expectation, but the case appears to be one in which reasoning is of no avail and the stern logic of facts is supplanted by the more pleasing pictures of the imagination. Certainly current business in Scotch pig with the States is on a scale sufficiently small to blast such hopes, nor is there the slightest foundation for the supposition that any extension will take place this year. The home business is good, especially as regards shipbuilding, which is enjoying greater prosperity than during any year since 1874. The tonnage already launched from the Clyde yards is in excess of that for any previous year, and so many new contracts have been concluded within the past ten days that the remainder of 1880 is certain to be an era of remarkable activity. Pretty much the same remark is applicable to the Tyne and Tees yards, so that the manufacturers of ship plates are easy as to the near future, whatever anxieties may disturb the minds of their brethern in other departments. Their briskness will favorably influence the crude branches of the iron trade, especially in Cleveland. In that district the shipments of pig average 2700 tons daily, and in spite of the large output there is but a slight increase in stocks. Elsewhere the smelters are anxious and not well supplied with orders. In respect of finished iron the sales of the week have been almost *nil*, neither venders nor buyers being willing to operate until the quarterly meetings. At those gatherings marked bars are expected to be reduced 10/ per ton and all other iron in proportion. Indeed, I have good reason for the belief that the list houses in Staffordshire have already held a preliminary meeting and have decided to lower marked bars to £7. 10/, instead of £8, as at present. This fact will probably be officially announced within the next two or three days. It has long been known that the list rates have been entirely nominal, one house, indeed, having openly broken away from the agreement early in the past quarter. The change has, consequently, been generally anticipated and discounted, but the official drop, if made, would tend to give a little more confidence than at present exists, and would probably further sales by convincing buyers that they need expect no greater reduction for some time to come. I suppose the "list" idea will be retained yet awhile, in common with sundry other remnants of bygone times. Its utility is considered to be more than doubtful by many fairly-informed persons, but the Staffordshire makers appear to swear by it—when it suits their convenience only—and look upon it as a sort of fetish which it would be dangerously risky to abolish. Of the quarterly meetings themselves I am, of course, unable to speak, but I assume that they will be well attended, and that the general concurrence in the proposed reduction of marked iron will have the effect of closing out many of the negotiations now in progress. The change would also bring the makers of best iron on better terms with the venders of common and medium sorts, who have latterly had their own way in a great measure. The sheet-iron rollers appear to have arrived at the conclusion that organization will remedy the ills from which they suffer, and they have, therefore, taken steps to consolidate the arrangements in that direction to which I have alluded in former letters. Of the remaining branches of trade, the only one I need allude to here is the tin-plate industry. In that there are loud complaints of the unwise extension of production now in progress in various parts of South Wales. The existing works are known to be making fully one-third less than their capacities, yet the new mills are rapidly coming into the market, and are said to be upsetting everything by their initial efforts to secure business. This course suits the merchants and exporters, who are thereby enabled to play off the rival producers to their own advantage, but it does not tend to the general prosperity of the trade. Last year the aggregate make was equal to about 5,000,000 boxes, whereas by the end of 1880 the total capacity will be nearly 7,000,000 boxes—a growth of 40 per cent. The demand increases yearly, but its expansion is by no means on this tremendous scale.

SCOTCH PIG IRON

is to-day quiet on the basis of 50/ for warrants, and other quotations as below. There are 104 furnaces in blast, as against 85 a year ago, while the quantity in Connal's stores amounts to 474,765 tons, as compared with 326,605 tons this date last year. The increase on the week has been 1146 tons. Shipments last fall were 4913 tons below those of the comparative period of 1879, but to date in 1880 there has been an increase of 134,340 tons, of which 119,000 tons have gone to foreign or colonial destinations. Imports of Cleveland pigs into Scotland are not large and have decreased 12,385 tons this year, or a total of 185,510 tons. Freights are easy. Ballast pig iron is 46/ per ton, delivered alongside ship in Forth or Clyde. Writing from Glasgow on October 8, Messrs. James Watson & Co. said: "The Scotch iron market has been very irregular this week, with a good business done in warrants, while the demand for makers' iron remains quiet. On Monday the market was flat, with business done from 49/9 @ 49/4½, cash. On Tuesday the price touched 48/11½, but afterward quickly rallied, and the closing figure was 49/5, cash. On Wednesday the market was strong, with a large business done from 49/4 @ 50/6, cash. Yesterday there was considerable fluctuation and excitement, a moderate business being transacted between 50/9 and 50/, cash. To-day the market opened flat at 49/9, afterward improving to 50/4, and closing at 50/ per ton. The shipments last week were 11,725 tons, as compared with 16,638 tons for the corresponding week of 1879." We quote:

	No. 1.	No. 2.
G. M. B., at Glasgow	51/6	49/6
Gartsherrie, at Glasgow	50/6	51/6
Coltness, "	59/6	53/
Summerlee, "	57/6	50/
Langloan, "	50/6	52/6
Carnbroe, "	54/6	52/
Calder, at Port Dundas	57/6	50/
Glengarnock, at Ardrossan	54/6	52/
Eglinton, "	51/6	49/6
Dalmellington, "	51/6	49/6
Shotts, at Leith	60/	53/6

The figures of John E. Swan & Bros., Limited, approximate with the foregoing. Few shipments of pig iron are being made to the United States, and the Canadian season is about at an end. The total iron exports from the Clyde last week were of the value of £87.000.

IN CLEVELAND

prices are steady, albeit quiet, on the following footing:

No. 1 Foundry	44/6	No. 4 Forge	38/6
2 "	42/	Mottled	38/
3 "	39/6	White	37/6
4 "	39/	Kentledge	42/6

The returns of the Ironmasters' Association for the month of September show particulars which I summarise as under: Make of Cleveland pig iron, 166,790 tons; decrease on month of 1892 tons: make of hematites and other pigs, 47,234 tons; decrease 1589 tons: total make, 214,024 tons. Shipments foreign from Middlesboro', 40,243 tons; coastwise, 38,685 tons; makers' stocks of Cleveland iron, 118,868 tons; decrease, 6015 tons; stock in warrant stores, 117,428 tons, increase 5000 tons; stock in makers' stores, 47,414 tons, increase 11,000 tons.

HEMATITE PIGS

are obtainable at 2/6 per ton below the quoted prices for small lots, which figures are:

	No. 1.	No. 2.	No. 3.
Cleator	75/	72/6	72/
Lonsdale	68/	67/	66/
Workington	68/	67/	66/
West Cumberland	....	....	....
Lowther	68/	67/	66/
Moss Bay	68/	67/	66/
Harrington	68/	67/	66/
Solway	68/	67/	66/
Maryport	68/	67/	66/

THE BOARD OF TRADE RETURNS

for the month of September have just been issued, and are regarded as being surprisingly favorable, not only in the aggregate, but also in respect of some of our leading staples, notably iron and steel. Those who have strong pessimistic inclinations poohpooh the idea that these returns are better evidence than their own senses afforded, but I tell you an incontrovertible fact when I assure you that the statistics are implicitly believed in by every man here whose head is square on his shoulders. The state of the markets has been so unpromising that there was a general expectation of returns showing a distinct relapse, whereas we have statistics affording conclusive evidence in precisely the opposite direction. The total value of our exports during September was £20,027,347, as against £17,402.242 in the same month of last year. For the nine months ending September 30 the figures are £167,019,777 this, and £140,176,165 last year. On the import side of the accounts I find the aggregate value for last month was £34,275,327, against £27,723,428 in September, 1879. For the nine months £309,907,762 and £259,346,232 respectively. The iron and steel exported last month was, in quantity, 297,013 tons and in value £2,204,285, against 287,067 tons and £1,782,425 in September, 1879. For the nine months this year the tonnage was 3,002,498 and the values £22,250,911, against 1,980,120 tons and £13,620,474 in the same period of 1879. Looked at from any standpoint, this makes an excellent showing, and proves to demonstration that, so far in 1880, our iron and steel trade has earned nearly £9,000,000 more than last year to date. The following figures give the shipments of iron and steel to the United States during the month of September of the present year, compared with those of the corresponding period last year, in tons:

	1879.	1880.
Pig iron	32,036	26,061
Bar, angle, bolt and rod iron	605	1,170
Railroad iron of all sorts	8,431	14,531
Iron hoops, sheets and plates	798	2,184
Tin plates	13,342	13,855
Cast or wrought	1,210	2,983
Old iron	26,549	4,571
Steel, unwrought	531	1,304
Iron rails	8,429	3,880
Steel rails	.....	1,052

The total shipments of English iron and steel to all countries were, in tons:

	1879.	1880.
Pig iron	120,696	127,126
Bar, angle, bolt and rod iron	28,052	26,517
Railroad iron of all sorts	47,722	50,130
Iron hoops, sheets and plates	19,038	24,294
Tin plates	17,335	10,660
Cast or wrought	23,293	27,525
Old iron	32,645	12,544
Steel, unwrought	2,546	3,877
Iron rails	9,378	7,130
Steel rails	31,241	36,150

YOUR PRESIDENTIAL ELECTION,

although watched each step taken by a small section of the public here, is not so prominent an item as might have been supposed. Those who have done or are doing business with the United States naturally manifest a keen interest in the varying fortunes of your two great parties in the State elections, but to the masses these matters are *caviare*. Not one man in twenty knows the distinction between your Republicans and Democrats, and not one in fifty, probably, could explain the differences of the two parties satisfactorily. More than this, I don't suppose there are more than a few hundred persons in the whole country who venture to anticipate that there will be any appreciable alteration in your tariff, whether one side or the other gains the day. Those who know most certainly hope least. They are perfectly cynical as to the rose-colored results predicted by the Cobden Clubbists as being probable should the Democrats carry the election. They tell us that the tariff won't suffer to any extent, because they are decidedly of opinion that your free-trade ideas are as yet in embryo, and protection is a real, live thing, against which it is useless to fight. The majority of British manufacturers naturally taboo these views, and seem to have convinced themselves that your people—especially the West—are ardently in favor of free trade. They, therefore, share the enthusiasm of the Cobden Club pamphleteers, and are up to the shoulders in the work of regenerating the United States backsliders.

FOREIGN.

FRANCE.

(Moniteur des Interets Materiels.)

PARIS, Oct. 10, 1880.—*Metals.*—Since our last report business has been moderately active. Metals have, on the whole, been steady, with the exception of some species of Copper 1 franc lower, and Spelter also weaker, while Tin has recovered 7.50 @ 10 francs the 100 kilos. We quote at the close *Copper*, Chili Bars, 157.50 @ 160; Ingots and Slabs, 165; Best Selected, 167.50; and Corocoro Ores, 167 50. *Tin*, Banca, 232.50; Billiton, 230; Straits and Australian, 227.50; and English, 225. *Lead*, 38.50 @ 39; and *Spelter*, 45 @ 46. *Iron.*—All French iron markets are very quiet, the tendency still being a dull one in consequence of excessive production going on. The accumulation of stock at this center begins to become something unusual. We quote here Merchant Iron, 18.50 @ 19; Coke Iron, 20 50 @ 21; Flooring Sheets, 18 50 @ 19; Sheets, 25.50 @ 26; Nails, No. 18, in bulk, 30 francs. In the Haute-Marne prices are sustained with difficulty. The revolution in Steel production by the Thomas-Gilchrist process begins to be felt more and more, and this is only the commencement of the changes to be wrought. The critical period we are now passing through gives us a foretaste of what is to follow, a thorough upsetting of all values in this branch. Hence there has been such an outcry when the Creusot reduced the price of steel rails; yet we ought to thank them for practically demonstrating what is to come. Everybody is now fairly warned. *Coal* remains active and with a steadily rising tendency; the outlook is a truly promising one.

BELGIUM.

(Revue Universelle.)

BRUSSELS, Oct. 10, 1880.—*Iron.*—The situation in Belgium remains a passive one—*i. e.*, there is a total lack of animation, prices meanwhile undergoing no change. The only works having the advantage of still receiving orders steadily are the larger establishments devoted to specialties. We quote No. 1 Merchant Iron 13 francs the 100 kilos.; No. 2 Sheet, 17; Thin Sheet, 26; English Pig for casting, 8.75 for No. 3. There is more inquiry from consumers for iron on distant deliveries. Smaller producers are very anxious to make sales on immediate delivery, and submit to all sorts of concessions in order to rid themselves of accumulated stocks. Under these circumstances an immediate recovery in point of values cannot well be thought of. *Metals* are steady. We quote Copper, 170; Spelter, 43.50: Banca Tin, 219; Billiton, 210. *Coal* has been doing tolerably well: the demand for winter supplies for household purposes begins to manifest itself. On the whole Coal is in a much more favorable position than many other articles, and this is by no means surprising. There are so many industries dependent on Coal is a flourishing condition in Belgium that the consumption of it is considerably larger than it has been for many years past, while the output has by no means increased in the same ratio. Formerly Coal was mainly influenced by the Iron industry in this country; but this is not the case any more. The Iron trade may even become duller than it is at present without affecting Coal in any appreciable manner.

GERMANY.

(Borsenhalle.)

HAMBURG, Oct. 11, 1880.—*Iron.*—We receive the ensuing report from Breslau: "The situation here has become a great deal worse, particularly with Merchant Iron. The great works in Upper Silesia, such as the 'Ring' and 'Laura,' perceive that their orders diminish, they therefore reduce prices in hopes of stimulating a demand. This has depressed Merchant Iron to 11 @ 11.50 marks. Pig Iron is quiet; consumers have laid in their supplies; the blast furnaces have sold out nearly their entire output, and speculators in the face of the turn which the English market has taken, abstain from all operations. The blast furnaces would be willing to sell at 2.90 marks." Our Dortmund correspondent writes: "The paralysis in the Iron branch is being intensified, particularly in Merchant Iron. The Russian orders have been filled; the demand for building is about at an end, and the requirements in other directions do not come up to expectations. The same thing may be said of Sheets. An attempt is made to raise the prices of Pig Iron, but I do not believe it will be attended with success. On the contrary, in the Siegen district, both Pig Iron and Iron Ore have been rather weaker. Orders for Steel Rails do not come forward. On the other hand, the machine shops and boiler makers still receive a fair amount of orders. *Coal* is more active in view of the approaching winter season, but prices have not improved. The Coal combination seems to me a fizzle and merely got up to create an erroneous impression at a distance. The penalty set upon swerving from the terms agreed upon by the producers is not enforced." *Metals.*—Lead has been dull; English Pig at 17 @ 17.50 marks per 50 kilos.; ditto Sheet, 17.50 @ 18; German Pig, 15 @ 15.50, and Spanish, 19. Copper is unaltered. We quote: Drontheim, 72; English Refined Ingots, 66 @ 68; ditto Sheathing, 76. Tin is firmer. We quote: Banca, 90; English Refined, 90 @ 92, and Australian and English Common, 88 @ 90. Spelter is sustained. We quote: The same spot and to arrive, 18.25 @ 18.50. Sheet Zinc.—Silesian, 23.10 marks per 50 kilos.

(Essener Zeitung.)

ESSEN, PRUSSIA, Oct. 8, 1880.—*Iron.*—It has lately been a subject of doubt whether the demand for railroad material in the United States would again be of such a pressing nature as to lead to purchases abroad. During the past week quite extensive inquiries have dropped in from there, however, particularly for Rails. Beside several large makers, like the Dortmund Union, the Phœnix, &c., the firm of Krupp alone sold during the past few days 25,000 tons Steel Rails for the United States, and there will further be made at once several large contracts with most of the works in this vicinity. This American demand, therefore, manifests itself at about the same time as last year, with this difference that most of our larger works have now plenty of other orders on hand, sufficient to keep them busy, and that in England all the Steel Rail works are similarly situated and ask higher prices for new contracts, because they look forward to an active fall and winter business. Hence, the Americans will not have the same opportunity they had a year since of making their first purchases at ridiculously low rates.

AUSTRIA.

(Austrian Trade Journal.)

VIENNA, Oct. 8, 1880.—*Iron.*—Bohemian rolling mills have again reduced the price of Merchant Iron 50 kreutzers per 100 kilos., a step which has undermined confidence in the immediate future still further, and in spite of the reduction business in the Iron trade does not revive. The fall trade in Austria proper has not come up to expectations, but from Hungary we receive more favorable advices. Prices there were reduced much earlier, and thus helped to stimulate trade, whereas in Austria proper the reduction has apparently come too late. There has been a good deal of bad management on the part of producers in Austria throughout the year, as we have abundantly shown on various occasions in these reports, and the consequences now begin to be felt, but we are too far advanced in the season still to remedy matters. When a good grain crop was in prospect makers became very sanguine and acted accordingly; it is now seen that this abundant crop has not mended the situation in the least. In Hungary makers managed more prudently; instead of clinging to old rates they reduced them early in the season, and have done a good trade. Now the Hungarians are busy in clearing out balances and are underselling Austrian makers. We hear that they sold a large lot of Merchant Iron as low as 125 florins per ton. We quote at the close: Common Pig, 50 florins; Gray ditto, 52; Bessemer Pig, 55 @ 60, at the works; Merchant Iron, 115 @ 125; Bohemian, 105 @ 110; Sheet for locksmiths, 160 @ 180; ditto for roofing, 170 @ 190; ditto for boilers, 170 @ 185; ditto for tanks, 160 @ 175, and pillars, 123 @ 125 florins per ton at Vienna. Metals have remained unchanged; we therefore merely refer back to our last week's quotations.

HOLLAND.

(Kosh & Vlierboom.)

ROTTERDAM, October 12, 1880.—*Tin.*—Since our last report sales have been insignificant. Early in the week prices receded from 52 and 50 for Banca and Billiton to 51½ @ 49½, but higher London quotations soon caused them to appreciate again, causing Banca to meet with purchasers at 52 guilders the 50 kilos., and Billiton at 51.50, the closing quotations being 52.50 for the former and 52 for the latter, the asking rates at which the market closes with remarkable firmness.

Over Production in the Bradford Oil District.

Advices from Bradford, Pa., under date of Oct. 24, state that there are, in round numbers, nearly 8000 producing oil wells in the Bradford district. Their daily yield is 70,000 barrels. The lower or old oil fields are producing 12,000 barrels a day. The daily demand for petroleum is 55,000 barrels. This is the amount now run by the pipe lines. The accumulation of oil for which there is no present demand long ago exhausted the storage capacity. For three mouths 6000 barrels of oil have been running to waste every day. There are 2,000,000 barrels of petroleum in wooden tanks at the wells. It is estimated that there are at least 8,000,000 barrels of accumulated stocks in the storage tanks of the pipe lines. The oil that is running to waste is run upon the ground and into the creeks. Enterprising individuals build dams along these streams and collect the floating petroleum. Hundreds of barrels are pumped off and stored in improvised tanks to await a market. Individual producers are building private tanks to store the overproduction. There are now 400,000 barrels of this tankage in this region. The number of wells steadily increase every month, in spite of the situation. The Bradford wells are all flowing wells. This fact is what caused the abandoning of so many of the wells in the lower field, they being all pumpers. Until recently the "sucker-rod" and pumping engine were almost unknown in the Bradford field. Now they are in demand. Many of the old wells have fallen off greatly in their yield. The supply companies cannot furnish enough sucker rods and engines to meet the call for them. Second-hand ones from the lower field find a ready market at good prices. This resort to the pump is creating no little uneasiness in the field. It indicates that the gas is failing. A flowing well on being pumped increases its yield largely, but the continuance of a full yield becomes uncertain. The positively defined area of the Bradford oil-producing field includes over 65,000 acres. There is a well to every five acres of land that has been developed, which leaves about 30,000 acres yet to drill. Wells on this territory will not be put down with such reckless haste as has characterized past operations, because it is controlled by large companies of capitalists.

Effect of Protection on Transportation.—Among the benefits which a protective tariff has brought to this country is the cheapening of transportation by cheapening the cost of constructing railroads. This cheapening of the cost of construction has been accomplished through the erection of competing works for the manufacture of iron and steel rails, iron car wheels, and other iron railway supplies. Steel rails, for instance, have been reduced in price from $150 a ton in gold, the price which we paid to England before we made any ourselves, to $40, the price at which American rails were sold in 1878. The present price is only $60. The reduction in the cost of transportation is shown in the following table of the average rate per ton per mile, at various periods, charged upon lines largely engaged in grain traffic:

Railroad lines.	1868. Cts.	1873. Cts.	1878. Cts.	1879. Cts.
New York Central Railroad	2.74	1.57	.93	.81
Erie Railway	1.81	1.45	.97	.78
Pennsylvania Railroad	1.90	1.41	.92	.79
Boston and Albany Railroad	2.22	1.96	1.13	1.10
Lake Shore and Mich. South. Railway	2.33	1.33	.73	.64
Michigan Central Railroad	2.45	1.22	.85	.69
Chicago, Burl. and Quincy Railroad	3.24	1.92	1.24	1.02
Chicago and Northwestern Railway	3.16	2.35	1.71	1.56

In 1868 this country had just commenced to make steel rails, and our supply came almost wholly from England. In 1873 we had fairly embarked in the business, and in 1879 we made, notwithstanding the "boom," nearly all that were required.—*American Iron and Steel Association.*

An interesting discovery has been made at Medusa, Albany County, N. Y., of two pigs of iron, weighing together about 90 pounds. As described to us by Mr. N. C. Whitcomb, of the Oakhill Manufacturing Company, Oakhill, N. Y., who purchased them from a peddler, these pigs bear the mark, "N. Yerk, 1771," with a horizontal anchor between the words and the date. The metal, which is, therefore, the product of one of the early iron works of the State, is reported to be of excellent quality, so far as a handsome, open fracture reveals it. It would be of much interest to trace the origin of these pigs, which must have apparently been carried a considerable distance. We may add that the vicinity of Medusa reveals no trace of any ancient iron-producing or iron-working establishment.

INDUSTRIAL ITEMS.

CONNECTICUT.

The Norwalk Iron Works Company have shipped recently three car loads of machinery, comprising one of their 20 x 24 inch compound air compressors with two 50 horse-power boilers, large air receiver, heater, steam pumps, &c. to the New York Iron Mine, Ishpeming, Michigan, of which Hon. Samuel J. Tilden is principal owner, it being a complete air compressing outfit for working rock drills and other mining machinery in their mines.

MASSACHUSETTS.

The John Russell Cutlery Company, of Turner's Falls, have just finished a new building for the manufacture of pocket cutlery and flat ware, 215 by 35 feet and 3 stories high. This action was necessitated by their rapidly increasing trade in this branch of their business. They will make from 200 to 300 different kinds of pocket cutlery. The concern is running full time with a full complement of hands, some 700 in all. They are turning out their usual line of goods, some 2500 different styles, which includes everything in the way of cutlery. —*Boston Commercial Bulletin.*

South Abington shipped for the week ending October 13, 1880, 1044 boxes, 55 kegs and 29 cases of tacks, nails, shanks and eyelets.

The Greenfield Tool Company was established in 1851 and employ about 75 hands. Their specialties are table cutlery, ox shoes and planes and molding tools for carpenters' use. They have been running on solid-handled goods for 6 or 7 years, but have lately engaged also in the manufacture of "scale-tang" goods. The Greenfield planes have long enjoyed a high reputation, and are to be found on carpenters' benches throughout the length and breadth of the and. Three or four large and conveniently-arranged buildings are occupied for the various kinds of work. These contain all modern machinery, which is operated by steam power. All work is warranted first-class. The establishment is now running full time and is behind with orders.

Although troubled by low water, the Henry Seymour Cutlery Company, of Holyoke, are running full time, and are turning out their usual lines of goods. The company produce first class shears and scissors, which are in demand all over the country. Their factory is well adapted for their purposes.

A new concern, though a thriving one, is the Greenfield Co-operative Manufacturing Company, established in March last. They employ 40 hands, and make a line of table cutlery, bread, butcher and kitchen knives. These goods are sold in New York city, and from thence are distributed all over the country. Their factory is 125 x 25 feet, two stories high, with an addition of one story. The office is 20 by 35 feet. A boiler of 75-horse-power generates the steam and a 40-horse-power engine furnishes the motive power for the establishment. The company manufacture medium goods, with wood and bone handles, well made and finely finished, and have a capacity for turning out 30 gross per day.—*Boston Commercial Bulletin.*

NEW YORK.

The Durhamville Glass Works, established in 1818, are now in blast. Messrs. Fox & Co., the proprietors, announce that they are now building an additional window glass factory, with a capacity equal to their present ten-pot furnace.

The annual report of the Third Avenue Railroad, of New York city, to the State engineer is as follows: Capital, $2,000,000; paid, $2,000,000; funded debt, $2,000,000; rate of interest, 7.70; passengers carried, 28,867,193; total cost of maintaining road and real estate, $51,476.46; expense of operating road and for repairs, $794,584.54; receipts from passengers, $1,343,359.67; from other sources, $335,019.46. Payments for transportation expenses, maintenance and repairs, $794,584.54; for interest, $140,000; for dividends, $420,000; for coupon bonds purchased, $16,000; cash on hand, $307,794.59.

John W. Smith and others are named as trustees of the Rochester Grape Sugar Company, with a capital of $1,000,000.

The Brooklyn Rapid Transit Company have elected as directors Messrs. W. B. Dickerman, Lewis A. Hall, Henry A. Root, Thomas A. Painter, Jr., M. Furman Hunt, Charles R. Flint, J. C. Hoagland, William Turnbull, E. F. Choate, C. L. Dee, R. C. Shannon, R. F. Sears and Edward H. Toby. Mr. C. R. Flint, who is a partner of W. R. Grace, of New York, has been made temporary president of the board of directors and E. T. Choate, secretary.

NEW JERSEY.

A beginning has been made in lamp goods at the new factory of Whitney Bros., at Glassboro, and a general line of flintware will be taken up.

The statement is authoritatively denied that Messrs. Hay & Co. were about to start another bottle factory at Winslow.

A company has been organized at Newark for the manufacture of stoves.

PENNSYLVANIA.

Messrs. Obert & Son, of the Union Boiler Works, have shipped twelve cylinder boilers to the Colebrook furnaces, in Lebanon County. Each boiler is 60 feet in length by 48 inches in diameter, and a large number of employees were engaged many weeks in their construction.

The coal product of the Schuylkill region for the week ending October 16, was 174,772 tons, as against 80,068 tons for the week previous, and 164,528 tons for the corresponding week of last year. The total product for the week was 580,187 tons, against 580,608 tons for the same week of last year, an increase of 90,579 tons. The total output for the year is 17,903,785 tons, against 20,626,712 tons for the corresponding period of last year, a decrease of 2,723,127.

A stock company is being formed at Litiz to manufacture plows.

Work at the Crane Iron Company's furnaces, at Catasauqua, is being pushed forward rapidly. No. 3 furnace is filling and will be lighted soon. The pillars for the new No. 1 furnace are already in place. New boilers for furnaces 4 and 5 are being placed in position. The new stack for these boilers is 130 feet high.

The machinery in the nail plate mill of the Pottstown Iron Company is undergoing a complete overhauling, under the direction of Mr. Mourey Nicolls, master machinist of the company. To the uninitiated the place looks like the *debris* of such a works after an earthquake had opened under it, but to the men who are handling the massive pieces of iron, &c., everything is in its place temporarily, and will be placed permanently when the proper time comes. Mr. Nicolls has a large force of hands at work. In consequence of these repairs the nail factory is not running this week.—*Reading Times and Dispatch.*

Mann's ax factory, near Lewistown, is filling a large order for double bitted axes, to go to Brazil for use in felling mahogany trees.

The new chimney house at Phillipsburg, on the Lake Erie Railroad, is doing a large business and turning out a fine line of goods.

The Philadelphia and Reading coal tonnage for the week ending October 16 was 202,891 tons, as compared with 189,999 tons for a corresponding period last year. The total tonnage for the year to the above date is 5,992,896, as against 7,016,210 tons for a corresponding time in 1879, or a decrease of 1,023,313 tons. At the present rate of tonnage, however, the above decrease will be considerably lessened. The policy of the company seems to be restriction in shipments.

The ax and hoe works of Hubbard, Bakewell & Co., in Beaver Falls, are turning out about 1000 planters' hoes per day, besides running the ax department to its fullest capacity.

The Bethlehem Iron Company, in one week recently, turned out 2909 tons of steel ingots, the largest output ever reached by any company, either in this country or in the old countries.

PITTSBURGH AND VICINITY.

Messrs. Edeburn & Cooper, civil and hydraulic engineers of this city, have been employed by the authorities of Wellsville, Ohio, to prepare plans and specifications for, and to superintend the building of, water works for their city.

All the glass works on the South Side are now in active operation. All these are not running full, however, some running at only half their capacity.

Lewis, Oliver & Phillips are running the electric light through their mills on the South Side. They have purchased the apparatus which was formerly in use at the Exposition.

In about 10 days the new glass furnace of Messrs. J. T. & A. Hamilton will be completed.

The Beaver Falls Co-operative Company are running steadily, but are unable to keep up with their orders.

We learn that Mr. John Nicholson, Jr., inventor of the gas furnace, is about to put up two puddling furnaces of this kind for the National Tube Works Company.

Messrs. Agnew & Brown are running their glass factory full, and report the demand for glass balls very good.

The Pittsburgh Clay Pot Company, Limited, are doing a first-class business, and reports indicate that pots of their manufacture stand excellently.

OHIO.

Rolling mill crayons are being manufactured to a large extent at the Anchor Soapstone Works at Cincinnati during the past year. Mr. D. W. Steward, the proprietor, informs us that the demand for this article for marking sheet iron has been largely increased, for which reason the works at this time are confined almost exclusively to that article. Besides the rolling mill crayons, he manufactures soapstone griddles, wash tubs, foot warmers, sinks and a variety of other articles, including soapstone dust for use in foundry facings, &c. The works are now running to their fullest capacity upon orders which are not likely to be completed this year.

After making several improvements at Mary Furnace, at Lowellville, owned by the Ohio Iron and Steel Co., the blast was put on on the 7th inst., and from the first two weeks' run most successful results were obtained. The furnace made uniformly No. 1 open foundry after the third cast, and has averaged considerably over 28 tons per day.

The Mowry Car and Wheel Works, Cincinnati, have sold their car shops to the Cincinnati Street Railroad Company. The car-wheel foundry is retained, however, and the company will continue to manufacture wheels.

The Ch'sholm Steel Shovel Works, of Cleveland, are putting in machinery for the manufacture of welded and riveted strap shovels; in addition to those already made. The building to be occupied by this machinery is a two-story brick about 35 x 75 feet, and is connected with their present works by a covered way. The demand for their shovels is steadily increasing—as is also the territory through which their sales extend. This has rendered necessary an increase of 50 per cent. in the capacity of the manufactory.—*Trade Review.*

It is intended that the Wm. Anson Wood Reaper and Mower Works, Youngstown, shall be put in operation by the first of December.

Messrs. Moell & Thompson, manufacturers of iron roofing and siding, Cleveland, report four orders aggregating 180 tons.

Coe & Welkes, Painesville, are making a specialty of saw-mill work and small engines. They are now building engines to be sent to Florida for saw-mill purposes, and are enlarging their works and force of men to meet the increased demand upon them.

The Phœnix Iron Works Company, Ashtabula, manufacturers of special machinery, such as friction pulleys, elevators, &c., are very much crowded with work. They are employing from 15 to 18 men and work overtime. They are having a pump factory added to their works.

The machine shops of Duvall & Co., Zanesville, are running 15 hours a day. Portable engines constitute their specialty.

Monitor Furnace, making car wheel iron, is making an average of 56 tons per week.

The Portsmouth Foundry and Machine Works are now running a force of 15 hands in their newly arranged department for shaping and finishing agricultural implement steel plates.

Glasgow Furnace, near Newcomerstown, has started up.

Lee Furnace, at Monday Creek, is averaging 210 tons per week.

KENTUCKY.

Bellefonte Furnace is averaging 12 tons per day.

Mount Savage will probably not blow out before Feb. 1. She is averaging 12 tons.

ILLINOIS.

We hear that a copper rolling mill is projected in Chicago, and that a site has been already purchased.

The barb wire manufactories of Chicago are very full of business, and all are running overtime.

John Featherstone, proprietor of the Columbia Iron Foundry, has recently been making extensive additions to his works on the North Branch.

A new brass foundry has been started in Chicago by Messrs. Anderson & Bros., and is already doing a very prosperous business.

Smith & O'Leary, proprietors of the Steam Hammer Forge Works, on West Lake street, report an unusual rush of work. They are running 38 hands overtime. This firm began making steel castings some time ago, and at present they have more work than they can attend to.—*Chicago Industrial World.*

The Union Iron and Steel Co.'s large shops for the manufacturing of railroad frogs and crossings are about completed.

The Big Muddy Furnace, located at Grand Tower, which was built several years ago but had never been put in blast, was blown in recently, and is now in full operation.

MICHIGAN.

The Portage Lake *Mining Gazette* gives the following as the yield for the first six months of the large producing copper mines of that district: Calumet and Hecla, 9708¾ tons; Osceola, 992¾ tons; Atlantic, about 792 tons; Quincy, 764¾ tons; Franklin, 709¼ tons. The Calumet and Hecla will enter the year 1881 the most completely equipped mine under ground and on the surface, in the way of extensive and efficient machinery, of any similiar industry in the world.

The Commonwealth Mine, as we learn from the Menominee *Range*, was closed down September 15 and the men discharged. The reason stated is that they have all the ore in stock pile that they can ship this season, and it is not proposed to run the mine the coming winter, as the ore can be mined next season as fast as shipped.

The copper rolling mill of the Native Copper Works, at Houghton, Lake Superior, is in full operation. The managers are now constructing a furnace on their premises for melting the scrap made in the mill.

MISSOURI.

The Cleveland Co-operative Stove Company are fully at work at their new foundry in St. Louis.

The Sligo Furnace, in Crawford County, was put in blast on Thursday of the present week, and is now running very satisfactorily. The Sligo is the largest charcoal furnace in Missouri.

The Great Western Glass Works, St. Louis, are running full time on druggists' and similar lines of ware.

The rolling mill of the St. Louis Stamping Company is in full and most active operation, manufacturing sheet iron for their particular business. Important improvements and additions have been, and are yet, being made there, which will largely increase their facilities for production. Business is equally brisk at their stamping works, and immense quantities of stamped granite hollow-ware and other articles are being daily turned out there. In their entire establishment they give constant employment to about 800 hands.—*Age of Steel.*

The Western Iron Boat Building Company are adding largely of machinery and other facilities to their already extensive establishment in South St. Louis, to enable them to keep up with the demands made upon them and for the disposition of business.

WISCONSIN.

The North Star Iron Works Company—a new corporation—inform us that they have purchased machine shops in Milwaukee, together with a full set of new and improved tools and patterns, and intend to make the building of Corliss engines and boilers a specialty. They employ 125 men, and are running their shops night and day. They report that they have orders to keep them busy for over three months. This company is made up entirely of Milwaukee parties.

LABOR AND WAGES.

An advertisement of the Pennsylvania Railroad offering cheap rates to iron workers from this city to Chattanooga, Tenn., appeared in several of the daily papers of this city the past week. We are unable to understand the object of this inducement; we can only look upon it as being a modern movement on the part of combined capital to beguile labor to a section of country where there is no demand for a single ironworker. The ironworkers of Chattanooga saw fit to organize under our banner some time ago, and upon being found out the different firms combined to crush the lodge in its infancy. In this they failed, as the lodge exists and is in a flourishing condition, and, so far as we know, everything is lovely at Chattanooga, with every situation in the mills filled. We embrace this opportunity to warn all ironworkers against being hoodwinked to Chattanooga by cheap rates. There is not one vacancy there for an ironworker, and the only conclusion to be drawn from the cheap rate advertisement is that they want to supplant those now there by non-union men. Keep away from Chattanooga.—*Labor Tribune.*

The Hocking Valley, Ohio, coal miners struck for and received an advance of 10 cents per ton, making the present price 80 cents per ton.

The latest news from the Corning mines, in the Hocking coal region, Ohio, is that all the State troops, except one company, have been withdrawn and everything at that point was quiet. The negro miners are gradually thinning out, and it is thought if all the troops are withdrawn all the colored miners will leave. The mines of a Mr. Longstreth, in the same region, which are being worked exclusively by whites brought from other States, were invaded Saturday by about 1000 strikers from other mines. Bloodshed was at one time imminent and only prevented by the arrival of the sheriff and three companies of State troops. The contest between the strikers and operators is not ended.

The strike of the steel melters at Miller, Metcalf & Parkin's, Pittsburgh, of which a full account was given in our last issue, still continues and has resulted in the stoppage of some of the other parts of the mill. The strikers do not attempt to answer the statement of the firm, but confine themselves to assertions that the demand for a reduction was unwarranted.

There is a disagreement between the miners and operators of the Borland shaft at Steubenville with regard to what price shall be paid per ton. A strike has been averted by both parties agreeing to submit the matter to D. R. Jones, of Pittsburgh, and abide by his decision.

The strike of the coal miners on the Baltimore and Ohio Railroad, near Pittsburgh, is still dragging along. It is reported that the miners at the Osceola and Armstrong mines, who struck for 3½ cents, have gone back to work at their old figure. The reason assigned is the action of the miners further up the road, who refuse to come out and can supply the market. The miners are willing to make a difference of one half cent a bushel in favor of coal sent East.

Recent dispatches say that about 500 union men are on a strike at the South Side Rolling Mills in Chicago, because the company refused to turn out a non-union man and put in his place a union man. An entire force of non-unionists has been put on and the mills started again on one-third time. Police are present to prevent trouble.

The Seawanhaka's Boilers.

Men have for weeks been employed with sledges, chisels and giant powder breaking up the metallic skeleton of the steamer Seawanhaka on the sunken meadows off Randall's Island. The old Hoboken ferryboat Chancellor Livingston has been run alongside, and pieces of iron and copper from the wreck are fast covering her decks. Whatever examinations have heretofore been made were at a decided disadvantage. The shell of the boiler remaining intact, it was only by crawling through the manhole that any idea of the condition of the flues and tubes could be obtained, and then only imperfectly.

It is not a flattering commentary on the methods of coroners' inquests that, where over 40 lives had been sacrificed, a jury should content themselves with an outside examination of the boiler. Had they stripped off the shell they would have discovered a break in one of the flues which throws some light on the cause of the accident. There are eight large circular flues to the starboard boiler, the outside one of which, at the point where it joins the back flue sheet, is cracked and torn nearly half way round. The rent begins in a narrow seam close to the flue sheet, but in the middle of it is a gap so large that one can easily put his hand through it.

Mr. Gregory, the present owner of the wreck, states that the boilers were made of a very poor quality of iron. Originally the iron of the flue was three-sixteenths of an inch thick, but in some places near the break it is not now more than one-sixteenth of an inch. The break gave every indication of an explosion. The force which broke it was evidently from the inside of the flue, since the jagged ends turn outward. A few inches from the place of the break the flue has at some time been patched, a fact which has not been developed by the official examinations. The patch is riveted to the flue, and covers the space of about half a foot. Until some better reason is put forward, the presence of that patch will be taken as an argument for the weakness of the iron.

The hole above described was not more than 8 inches from the patch, and the wearing-out process must have been going on for a considerable time. Mr. Gregory could not say how much the break had to do with the accident, but an expert could easily determine. If the break occurred before the fire it certainly is large enough to have admitted the water and caused a back draft. That a back draft created the fire is the opinion of four-fifths of the experts who have testified since the catastrophe. The importance of Mr. Gregory's discovery becomes all the greater when it is remembered that on the 10th of August last the United States Grand Jury found indictments for manslaughter against the following persons: Austin Jayne and Andrew Craft, inspectors of life boats, rafts and life preservers; John K. Matthews and Alexander Cauldwell, inspectors of boilers and machinery of steam vessels; Charles P. Smith, captain and master of the Seawanhaka; Benjamin C. Kirk, S. L. M. Barlow, Stephen Tabor, James Udal, Edward Morgan, Silas Mott and Stephen H. Townsend, owners of the Seawanhaka.

A suit for infringement was brought in the Circuit Court of the United States for the Eastern District of Pennsylvania, by the Chalmer Spence Co., against J. Newton Pierce *et al*, of Philadelphia, and on a motion for a preliminary injunction before Judge McKenna on the 9th inst., the pretension that there could be a patent on an "air space" was not obtained. The Court held that "there is but a single question, and that a very narrow one, involved in this hearing—it is the devising of the jacket and its support upon the outer surface of the boiler to be covered, forming an open framework with meshes, so that the question to be considered comes down to this: Whether the alleged infringing device is substantially different from the one embraced in this patent? We have no doubt that there is no fundamental difference between those devices, and we, therefore, grant the injunction."

An Extraordinary Railway Accident.—The New Zealand *Herald* prints the following account of a strange railway accident: The train which left Graytown for Wellington at 8.30 a. m. on September 12, when just beyond Cross Creek, was blown off the line and hurled over a precipice 70 feet high. The luggage van and passenger carriages were overturned; the couplings did not break, but still held the carver frames to the engine, which remained tightly gripping the middle rail, and luckily held firm, although swaying visibly under the strain. The whole of the upper part of the carriage, however, was smashed into matchwood and hurled over the precipice, passengers and debris being scattered among boulders down the side of the declivity, but not falling to the bottom. For a while, however, the wreck of carriages hung suspended above them, and had it given way or the engine fallen over, all must have been crushed to a jelly, as the gully at this place converges almost to a point nearly 100 feet below, so that had all gone down they would have been crushed into a compact mass at the bottom. They lay around for a time unconscious, and those who first recovered their senses described the scene as a fearful one—killed and wounded lying around in all directions covered with blood, and the train above suspended in mid-air, threatening every moment to fall on them. A Fell brake was detached to run down the incline for assistance. The two produce wagons were also capsized by the gale, and the engine had to sustain a double strain of the several vehicles hanging over the precipice at both ends, full weight on the couplings, which fortunately held fast.

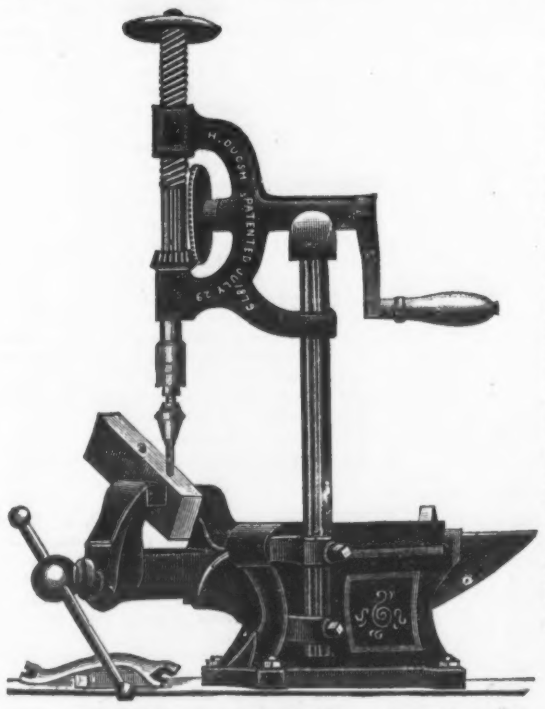
The Improvement in British Trade.—The official returns of the English Board of Trade afford indications that the business of that country is reviving from its long depression. The increase of imports in September, 1880, over the imports of September, 1879, amounts to £6,551,899, or nearly 24 per cent., and the increase for the first nine months of the year is £50,561,530 or 19½ per cent. An increase of more than $300,000,000, estimated in our money, is a pretty conclusive proof of awakening business. When we turn from imports to exports we also find an increase, not so large, indeed, for the particular month of September, but in about the same ratio for the first nine months of the year. The exports of England never equal her imports, by reason of her large investments in various foreign countries. The interest or dividends on these investments come back in the shape of commodities, which accounts for the excess of her imports over her exports. It is a healthy indication of reviving business that the Board of Trade returns show an increase of about one-fifth both in imports and exports as compared with the corresponding nine months of 1879.

A strange railway accident occurred recently in England. The Scotch Express left St. Pancras for Edinburgh in good time, and proceeded on its way without any mishap until near the Kibworth Station, when the engineer had occasion to fear that something had gone wrong with the driving gear of the engine. Applying the Westinghouse brake, he pulled up the train; but on examination nothing was found to be wrong. Upon this the train was put in motion again, but from some unexplained cause the driving-gear was reversed, so that on steam being turned on the locomotive, instead of going forward, sent the train backward at a rapid rate, the heavy engine soon developing speed. Neither the engineer, stoker, nor guard, all of whom are said to have had perfect control over the train by means of the continuous brake, discovered the terrible mistake that had been made until it was too late to prevent a collision. The blunder was detected in time to effect a considerable reduction in the speed before the train crashed into another. As it was, two Pullman cars were smashed in and five passengers injured, one so seriously that his life is in danger.

Messrs. Norrington, Sons & Co., English ironmasters, brought suit against Messrs. Peter Wright & Sons, of Philadelphia, to recover upward of $80,000 damages for a failure to accept 5000 tons of old iron rails, alleged to have been contracted for last January. The evidence showed that certain quantities of the iron were to have been shipped in February, and as the shipments fell below the amount stipulated, the defendants, upon receiving notice of that fact, rescinded the contract of purchase, and refused to accept any more iron. Subsequent shipments were made to this country, but the defendant company refused to accept them. Iron fell rapidly in value, and the plaintiffs claim they were damaged greatly by the failure of Wright & Sons to fulfill the contract. A non-suit was taken by the plaintiffs, and the following paper was appended to the judgment: "Plaintiff's admitting that there is no evidence of notice to the defendants of the omission of the plaintiffs to perform the contract at the time of the notice of recision, the Court, at the suggestion of the plaintiffs, directs a non-suit, reserving leave to move to take it off."

The process of manufacturing steel by the Bessemer converter has been fittingly illustrated in the gold casket presented by the city of London to Sir Henry Bessemer. It is of solid English design, surmounted by a finely modeled figure of commerce standing between a stack of pig iron and the converter. She commends the invention on account of the impetus that cheap steel gives commercial enterprise. The overflowing cornucopia at the base signifies this success. On either side of the rounded cover are vignettes—in *repoussé* work—of a London and Northwestern Railway locomotive—entirely constructed of this steel and standing on its steel rails—and of a steel-clad ship. The two curved ends contain the enameled arms of the city, with the dragons modeled in high relief. On the center panel is the medal Sir H. Bessemer gives annually at the Iron and Steel Institute. The inscription is on the reverse. Shields for the Bessemer arms and monogram complete the whole, which rests on a plateau of Bessemer steel.

ANVIL, VISE AND DRILL.



This machine was first made by a practical mechanic for his own use, and to meet a want which nothing in the market would fill. It was so highly regarded by all who saw it that he was minded to get it patented and manufactured for the market. When it was brought to our attention we saw at once its great utility, and bought the exclusive right for the whole United States. We believe it will come into general use as fast as its merits become known. The anvil face is 4x8 inches, and hight 6 inches. Width of vise jaw, 3½ inches; steel drill press, with adjustable chuck to hold ¼-inch drills, and all smaller sizes. The article to be drilled can be held firmly in the vise, so as to be drilled at any angle, or if it is too large for the vise it can be drilled on the anvil. The drill may be removed when not in use. Price for the whole, $18. Weight, 80 pounds. The vise and anvil are complete without the drill, and are sold for $10; weight, 60 pounds. For all jobbing shops, it is worth much more than it costs. Farmers can do with it many jobs which otherwise would have to be sent to the shops. All Hardware dealers who do not keep them in stock will furnish them on demand, or we will send them on receipt of the price.

MILLERS FALLS CO.,

74 CHAMBERS ST., NEW YORK.

HEATON & DENCKLA,

Hardware Commission Merchants,

507 Commerce Street, Philadelphia.

E. & G. BROOKE'S "Anchor Brand" Nails, Brads, Spikes, &c.
MALLORY, WHEELER & CO.'S Door and Pad Locks.
UNION MANUFACTURING CO.'S Butts.
AMERICAN SCREW CO.'S Screws.
D. R. BARTON TOOL CO.'S Edge Tools, &c.
FRANCE'S Shutter Holders.
Anti-Window Rattlers, Brass and Nickel-Plated.
WESTERN FILE CO.'S Cast-Steel Files.
AMERICAN SHEAR CO.'S Shears and Scissors.
H. M. MYERS & CO.'S Shovels, Spades and Scoops.
STEELE & SONS' Wrought Handle Sad Irons.
EXCELSIOR MILLS, Genuine Turkish Emery.
BROWN & BRO.'S Brass and Copper Wire, Rivets, Spoons, &c.
GAYLORD MANUFACTURING CO.'S Till, Chest and Cupboard Locks.
AMES' Genuine (A) Chester Emery.
COLWELL & COLLINS, NORWAY BOLT CO., Norway Carriage and Tire Bolts.
PLYMOUTH MILL CO.'S Black and Tinned Iron Rivets.
AMERICAN MACHINE CO.'S Fluters, &c.
STUART, PETERSON & CO.'S Tinned and Enameled Ware, &c.
HUSSEY, HOWE & CO.'S Bar & Sheet Cast Steel.

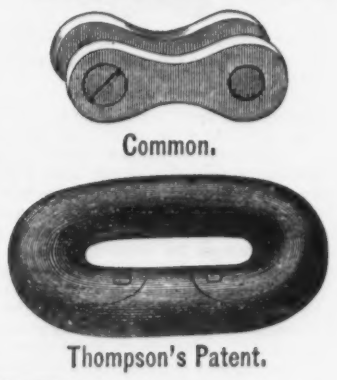
Also a large line of Heavy and Shelf Hardware.

Providence Tool Co.,

PROVIDENCE, R. I.

CONNECTING SHACKLES.

Wrought Iron, Improved.



Common.

Thompson's Patent.

Prices furnished on application.

HENRY B. NEWHALL,

105 Chambers Street, New York Agent.

RIPLEY MANUFACTURING CO.,

Unionville, Conn., U. S. A.

BEST PORCELAIN-LINED LEMON SQUEEZERS.
"Common Sense" Mouse Traps.
HAND-MADE ROSEWOOD FAUCETS.
Housefurnishing Hardware.
FOR HOME AND EXPORT TRADE.

DAVID HYMES & CO.,

92 CHURCH STREET, NEW YORK,

MANUFACTURERS' AGENTS.

Bargains in Hardware & Cutlery.

Low estimates made on all kinds of **SMALL CASTINGS,** in the **Rough, Japanned** or **Varnished.**

NATIONAL Horse Nail Co.

MANUFACTURERS OF

FINISHED

[BRIGHT OR BLUED]

These nails are made of the best brands of **NORWAY IRON,** and are guaranteed to be equal to any in the market.

NATIONAL HORSE NAIL CO.,

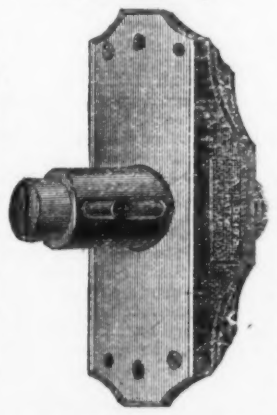
VERGENNES, VT.

DURRIE & McCARTY, Agents,
No. 97 Chambers St., New York

A. E. DEITZ,

(Successor to Barnes & Deitz,)
Manufacturer of
Store Door Locks, Night Latches, Padlocks, Drawer Locks, &c., with Flat Steel Keys.

EXTENSION TUBE



STORE DOOR LOCK, No. 184.

Durrie & McCarty, Agents,

97 Chambers & 81 Reade Sts., New York.

WALKER'S

Forged Horse Shoes,

SHOENBERGER'S

Patent Toe Calks,

Superior to any in market.

Send for prices and samples.

A. BUSSING, General Agent,

4 Warren St., New York.

Peckham's "NEW IDEA"

3 lb. Mica Package for 1880.

PRICE REDUCED.

Put up expressly for Retail Dealers who desire to buy small quantities and a variety of desirable and saleable sizes. Put up in a neat and attractive Show case.

TWELVE SIZES OF MICA,

Of the very best quality.

¼ lb. 3x6	¼ lb. 2½x4½	¼ lb. 4½x6
¼ lb. 4x5	¼ lb. 2½x3½	¼ lb. 3 x3
¼ lb. 4x7	¼ lb. 3 x5	¼ lb. 3½x4
¼ lb. 2x3	¼ lb. 5 x8	¼ lb 3½x3½

PRICE, $8.00. Net cash. No discount.

This Package sent FREE by express or mail to any part of the United States.

J. S. & M. PECKHAM, Utica, N. Y.,

Miners and Wholesale Dealers in North Carolina Mica.

RIEHLÉ BROS.

STANDARD

SCALES

AND

TESTING MACHINES

OF ALL VARIETIES. SEND FOR PRICE LISTS.

Office and Works, 9th above Master, Store, 51 and 52 South Fourth St. } Philada.
NEW YORK, 91 Liberty Street.
PITTSBURGH, 40 Penna. Ave.
G. V. HALLIDAY & CO., Agents, North 4th St., St. Louis, Mo., and New Orleans, La.

TINIUS OLSEN & CO.,

STANDARD SCALES

AND

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Manufacturers of Olsen's Little Giant Testing Machine, and Improved Railroad, Wagon and Furnace Charging Scales.

Office and Works, N. W. cor. 12th and Buttonwood Sts., Philadelphia.

R. C. PURVIS,

Manufacturer of

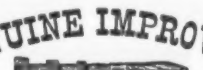
Octagon Tea Pots.

Rear of 407 Cherry St., Philadelphia, Pa.
Send for Price List.

Established in 1839. *Formerly L. & A. G. Coes.*

L. COES & CO.

Manufacturers of L. Coes'

GENUINE IMPROVED  AND MECHANICS

Wide Bar Full Length. Wide Bar Full Length.

Patent Screw Wrenches

UNDER PATENTS DATED

JUNE 26, 1866,
MARCH 23, 1869,
REISSUED 1870.

NOVEMBER 10, 1863,
FEBRUARY 23, 1864,
REISSUED JUNE 1, 1869,
IMPROVED AUG. 1, 1877.

The back thrust when in use borne by the SHANK instead of the Handle

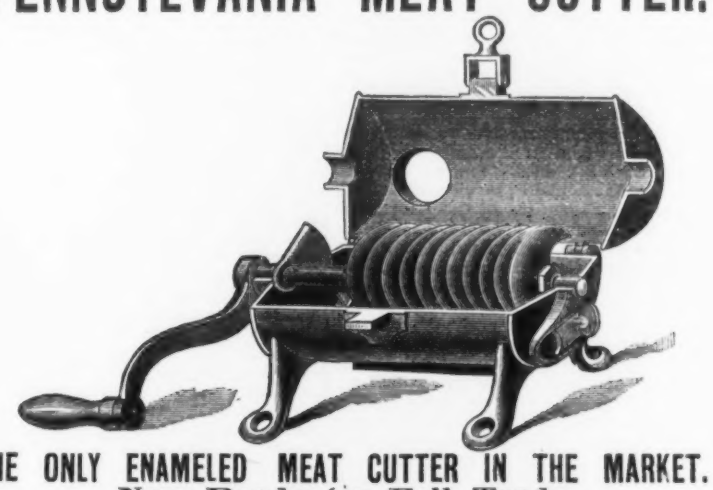
None genuine unless stamped "L. COES & CO."

WORCESTER, MASS.

Warehouse, 97 Chambers St. & 81 Reade St., N. Y.

DURRIE & McCARTY, Sole Agents.

PENNSYLVANIA MEAT CUTTER.



THE ONLY ENAMELED MEAT CUTTER IN THE MARKET.

Now Ready for Fall Trade.

PRICE LIST.

No. 1,	containing 8 Steel Knives, per dozen	$24.00
No. 2,	" 11 " " " "	28.00
No. 3,	" 12 " " " "	36.00
No. 00,	Enameled for Family Use, with Screw Clamp, to screw on table, per dozen	28.00

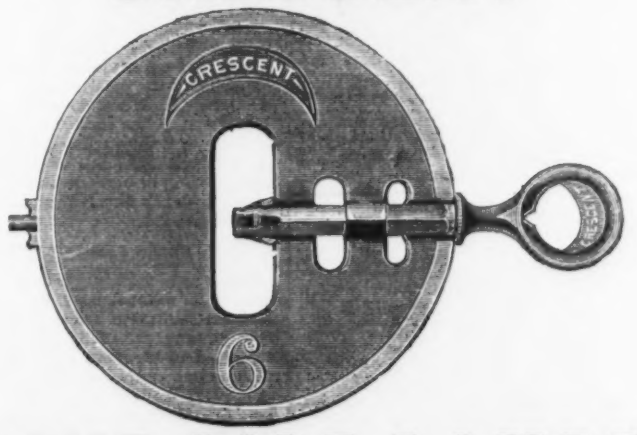
Discount to the trade, 50 per cent For sale by

LLOYD, SUPPLEE & WALTON, Philadelphia.
DURRIE & McCARTY, New York.

ALSO,

PENNSYLVANIA LAWN MOWER, 1880.

"CRESCENT"



STOVE PIPE DAMPER.

PATENT APPLIED FOR.

THE BEST THING OF ITS KIND IN THE MARKET. CONSTRUCTED ON AN ENTIRELY NEW PRINCIPLE, EMBODYING SIMPLICITY, EFFICIENCY AND NEATNESS.

No Small Pieces to Lose, No Spring to get Out of Order, No Nut to Work off.

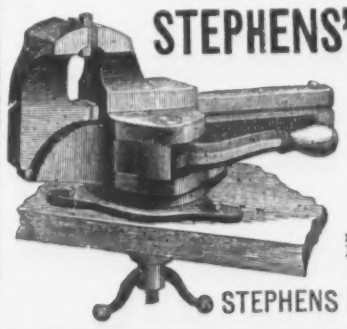
This Damper consists of but TWO pieces—the STEM and BLADE—the parts being so constructed that when the former is inserted (either side up) it engages within a notch near its end and a raised catch formed on the blade, which effectually prevents the stem from working out while in practical use, and at the same time admits of its withdrawal by the application of a little extra pressure outward. The Damper is held in any desired position by the pressure brought to bear on the pipe between the shoulder of the handle and the ends opposite and around the pivot formed on the blade.

Owing to its simple construction, no directions for attaching are necessary.

THE CLARK MFG. CO., Sole Manufacturers,

BUFFALO, N. Y.

STEPHENS'



PAT. VISE

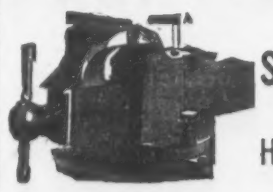
AND ATTACHMENTS,

Stationary and Swivel Bottoms.

Adapted to every variety of work, from jewelers to locomotive works. Opens FURTHER, holds FIRMER, is HEAVIER and MORE DURABLE than any other Vise. For sale by the Hardware trade.

STEPHENS PAT. VISE CO., No 41 Dey Street, New York.

PRENTISS PATENT VISES



ADJUSTABLE JAWS,

Stationary & Patent Swivel Bottoms

ADAPTED TO ALL KINDS OF VISE WORK.

HALL MFG. CO., 23 DEY ST., NEW YORK.

Send for Circular.

(*Continued from page 15.*)

in past geological ages. Transverse intersecting dykes and tongues of eruptive rock are seen in various parts of the eastern hill to penetrate the mass of ore, without, however, apparently altering in any way its character; and it must be concluded that this trap, which was intruded into the ore beds, has no further connection with their present condition than is implied in its protection of them from waste and removal. From the valley which separates the middle from the eastern hill, the western face of the latter is seen to consist of nearly horizontal beds of ore lying between upright bounding walls of trap, the extremities of the curved rim of the rock, which surrounds, on the other sides, this great mass of iron ore. At the base, the inner surfaces of these walls are, probably, not more than 500 feet apart; but, as they ascend, they are separated 600 feet or more. Between these ore is found in nearly horizontal strata, sometimes slightly contorted and associated with layers of a greenish granular silicate, approaching hornblende in composition, and more rarely with a chlorite-like mineral or with serpentine. Besides these, small quantities of iron pyrites, sometimes cobaltiferous, are found, and portions of copper, chiefly in the forms of copper pyrites, malachite, and red oxide. These latter ores are in some parts of the deposit so abundant that they are selected in mining the iron ore and sold to the copper smelters. The whole of the deposits as mined, with the exception of the richly cupriferous portions and some thin layers in which the silicated minerals predominate, is fit for the furnace, and will probably yield an average of 50 per cent. of iron, while large quantities can be selected which are much richer and are nearly pure magnetite. Its associated minerals, not less than its comparative softness and friability, due to the slight adhesion of the crystalline grains, serve to distinguish it from the magnetites of the Laurentian rocks. The analyses of the ore of this great deposit, which we give below, show that it is comparatively free from phosphorus. The varying amount of sulphur, which is present in the form of pyrites, may be readily expelled, if desired, by a preliminary roasting, and has been spontaneously removed by oxidation in the weathered portions of the ore at the surface of the deposit, which are carefully reserved and command a high price for fettling in the puddling furnace. The facilities for mining this ore are very great, the horizontal layers being worked in successive benches, forming wide terraces on the hillside, which are accessible by railway tracks and locomotives. It is stated that the greatest production of this mine has been about 200,000 tons yearly, but it would be easy, if demanded, to supply a much larger quantity of the ore, the more so as workings are not confined to the eastern hill, but extend to others named, which afford also very large quantities of ore. As regards the further extent of the deposit, it may be noticed that excavations in the plain, to the east of the hills, and, consequently, outside of the limits of the trap, show the existence of large quantities of similar ore, which were mined at an early period. In the area of the middle hill, moreover, two borings have been sunk to depths of 240 and 335 feet below water level, the whole distance being in iron ore. The strata in this portion offer but gentle inclinations, so that these measurements do not much exaggerate the real thickness of the immense mass of ore which lies beneath the surface.

The following are complete analyses of the Cornwall ore made by Dr. F. A. Genth, of the University of Pennsylvania:

	I.	II.	III.	IV.	V.	VI.
Magnetic Oxide of Iron	78.278	62.198	67.383	68.965	55.175	41.133
Sesquioxide of Iron	1.840	1.480	Trace.	22.704	1.300	50.398
Oxide of Copper	0.200	0.095	0.153	0.250	0.030	0.105
Oxide of Cobalt	Trace.	Trace.	Trace.	0.067	0.076	Trace.
Oxide of Manganese	1.286	.....	0.083	Trace.	Trace.	Trace.
Alumina	1.000	1.105	1.867	1.228	3.103	1.904
Magnesia	2.605	2.105	1.810	1.393	1.510	1.396
Lime	0.078	0.010	0.026	0.150	0.030	0.030
Phosphoric Acid	0.090	0.034	0.105	0.013	0.021	0.006
Sulphuric Acid	0.084	0.000	0.240	.....	0.187	.....
Silicic Acid and Quartz	11.080	28.000	18.000	2.800	37.860	3.840
Copper Pyrites	0.353	1.813	0.333	.....	0.654	.....
Iron Pyrites	5.223	1.702	8.599	0.084	1.479	0.613
Water, &c.	0.649	0.598	9.523	2.043	0.613	2.107
Metallic Iron	59.229	46.438	52.666	65.958	39.380	64.993
Metallic Copper	1.589	1.814	0.686	0.800	1.346	0.024
Phosphorus	0.038	0.004	0.00046	0.0057	0.00013	0.00026
Sulphur	0.910	1.672	4.549	0.045	1.076	.....

At Lebanon, early in the evening, the party broke up. Some went East, some waited at Lebanon for trains and some returned to Harrisburg, where they enjoyed in the evening the hospitality of Mr. and Mrs. C. L. Bailey. There was a unaminous expression of satisfaction and gratification, and with one accord the Harrisburg meeting was pronounced "a success." Certainly everything was done that could be done to make it pleasant and instructive, and we predict for the National Association of Charcoal Iron Workers a long and useful life, and a great and permanent influence in promoting a progress in scientific forestry, in charcoal burning and charcoal iron making which shall place this once more in the front rank of our national industries, realize its neglected possibilities of development and keep its historical associations ever fresh in the memory of the American people.

A decision of some interest was recently made by Commissioner of Patents Marble in the case of Harrison *et al vs.* Hogan *et al.* The following is the decision: "As between an employer and a party employed for a special purpose, features suggested by the employee which are merely tributary to the main invention, can give to him no claim as an inventor, and in regard to such features as amount to independent inventions, a presumption exists in favor of the employer."

Papers on Practical Founding.—VIII.

BY EDWARD KIRK.

FOUNDING.

The art of casting and founding metals is as old as, or older than, any of the modes now used for manufacturing metals into useful forms. So extensively is this process carried on that there is scarcely a town of any importance in this country that does not contain one or more foundries. To a person unacquainted with founding, these foundries seem to be all alike, except that one may be a little larger than another, but they all appear to be old, rickety buildings, the floor and walls of which are covered with dirt and rubbish. This seeming dirt and rubbish are the treasures of the founder—the molding sand and flasks, without which the molder could make nothing. To the practical founder there is a wide difference between foundries that are designed for different kinds of castings. So great is the difference in the nature of the molding sand and foundry fixtures used for different kinds of castings, that in many cases a first-class molder on one kind of castings knows no more about making another kind than a man that has never been in a foundry. Foundries are designated by names generally derived from the kind of castings that are made in them; thus, a foundry in which stoves are made is called a stove-plate foundry; one in which pots, kettles, &c., are manufacted is known as a hollow-ware foundry; one in which pipes are made is designated a pipe foundry, and one in which machinery is constructed is termed a machinery foundry, and so on—every foundry receiving its name from that class of castings of which it produces the largest amount. When two kinds of castings are made in the same foundry it receives the name of both, and is called a stove and hollow-ware foundry, or a stove and machinery foundry, and so on. A foundry that has no special business, but makes any and every kind of work that comes along, is called a jobbing foundry. Then there are the iron foundries and the brass foundries, which receive their names from the kind of metal that is melted and used in casting. Besides these different branches or specialities of the business, there are the three different styles of making the molds. These are called the green sand, dry sand and loam molds. In each of them entirely different materials are used, and the flasks and fixtures for each are different; yet these three kinds of molds are generally made in the same foundry—that is, in jobbing or machinery foundries. In stove or hollow-ware foundries the molds are made entirely of green sand.

In all these foundries the floors and gangways are arranged differently, and different grades and qualities of sand are used to suit the casting to be made. The molding flask, ladle, molding tools, and, in fact, all the foundry fixtures are different, and there is as much difference between two foundries designed for different kinds of castings as there is between a canal boat and a first-class steamboat. There is but little regularity in the shape or size of foundry buildings, for in the majority of cases they have been originally small, and have been enlarged by additions as the business increased. There are foundries that contain almost as many rooms and departments as some of our hotels, but they are very inconvenient, and the molders cannot work to as good advantage in them as in a large, well-lighted room. As there is so much difference between the various kinds of molds and the different branches of founding, I shall describe each branch of the business separately, with the fixtures and buildings best adapted to each.

GREEN SAND FOUNDING.

Green sand founding is the art of forming sand, in its natural state as it comes from the sand-bank, into molds, by the use of patterns or sweeps. This branch of molding is carried on far more extensively than any of the other kinds. All light castings, such as stoves, hollow-ware, light machinery, &c., are made in green sand. For green sand molding a grade of sand is used that has a very fine grain and contains just enough loam to make it cohere firmly when pressed in the hand when it is a little moist, yet falling to pieces readily when touched or lightly pressed between the fingers. For stove plate and all light work a very fine-grained sand is used, and as the work gets heavier a coarser-grained sand is employed, because, while a very fine-grained sand will make a smooth casting in light work, and is the best sand for very light work, yet it would make a rougher casting than a coarse-grained sand if used for heavy work, as the prolonged heat in a heavy casting burns the sand, so that it adheres firmly to the casting, making it rougher, even after the removal of the sand, than if it had been cast in coarser sand. Moreover, the heavier the casting the greater the heat and the more gas it will generate in the sand, and the coarser the grains of sand the more open it will be and the more rapidly will the gas escape, lessening the risk of the formation of blow-holes in the casting. Sand for green sand molding is first taken from the sand bank. It is of a yellowish, earthy color and is called new sand. After it has been used a short time for molding and casting it becomes burned by contact with the molten metal and soon turns to black. It is then called old sand, and is better for molding a surer mold than new sand. The more sand is used the blacker it becomes, and the less strength or adhesiveness it possesses. In time it would become so rotten that it could not be used for molding, as it would not be strong enough to hang in the flask or resist the pressure of the molten metal in the mold. To prevent this and keep the old sand in good condition, a little new sand is added every few heats. This is done not only to strengthen the sand, but also to keep up the sand heap, for every time that a casting is made, more or less sand adheres to it and is removed from the heap, which gradually decreases. If this be done the sand need never be removed from the foundry and replaced with new sand. When a sand heap has been used for a long time without the addition of new sand, it becomes perfectly black; but if new sand be added occasionally, it keeps the heap of a dirty brown color, and the more new sand is added the lighter becomes the color of the sand, so that the molder can always tell the condition of the sand by the color of the heap. When a green sand mold is to be made, the sand heap is wet with water, so that the sand will firmly cohere when pressed in the hand, yet not so that it will adhere to the hand. After the sand has been perfectly wet it is mixed up, so as to give it an even temperature throughout. This is done by commencing at one end of the heap, shoveling it back one or more feet, and forming it into another heap. All the hard lumps of sand are broken up by striking them with the back of the shovel, and only a small shovelful is lifted at a time. By a slight twist of the shovel the sand is spread over the end of the heap. In this way any wet or dry spots that are made when wetting the sand are thoroughly mixed and the temperature of the heap is made even throughout. This operation is known as cutting over the heap, and is one of the most important in green sand molding, for if the sand is made too wet it generates so much gas and steam when the molten metal comes in contact with it, that it repels the metal and increases the difficulty of producing a casting free from blow-holes; on the other hand, if the sand is too dry it cannot be made to retain the proper form in the mold, and it will not resist the pressure of the molten metal. The three principal divisions of green-sand molding are open sand work, flask work and snap work. Open sand work is any kind of work in which only one side of the casting is formed in the sand, the other side being made in the open air. No casting can be made in open sand, unless its upper surface be horizontal, for the molten metal will find its level just as water does. The open sand mold is a very cheap one, and nothing is ever made in this way except cheap, unimportant castings, such as plate for air furnaces, core and loam plates, grate bars and like castings. The upper side of a casting made in open sand is always rough and full of dirt and scruff, and the upper edges are always rough and uneven, which does not do for first-class work.

Flask work is any kind of work that is made in a flask or box. These flasks are made in two or more pieces to suit the size and shape of the casting, and they are designed to hold the sand in proper shape to form the desired mold. Casting flask work comprises all the important work of any size or weight that is made in green sand. The flasks are made in various shapes and of different materials, according to the work they are destined for; but they are all on the same principle, and are merely frames for holding the sand in place. To form the molds in these flasks a certain amount of sand is used between the pattern and the flask, as will be explained, and, in order to work economically, it is important that the flasks should not be too large for the pattern, as more sand and more labor would then be required to make the mold. A special flask is, therefore, made for each kind of pattern, and in order to avoid the expense resulting from the accumulation of many flasks that might never be used more than once or twice, founders have divided flask work into different branches or specialties. In these different branches are generally included all kinds of work requiring similar flasks and the same quality of metal; in stove work, for instance, many different sizes and shapes of flasks are used, but they are all made upon the same principle, and for straight work the copes and drags are all the same hight, and the copes are all based upon the same general principle, so that many of the flasks that are designed for one stove can be used for another without any alteration or additional expense. The same is true of machinery molding, where one flask can be made to serve for many different castings, but stove flasks, with their light, shallow drags and copes, could not be used for stove work. Therefore, if these two branches of the work are carried on on a small scale in one foundry, many more flasks will be needed than would be required to do the same amount of business with only one branch of work.

Snap work comprises all very small light castings in green sand. For this kind of molding, flasks are used that can be removed from the mold after it is formed. The snap flask is made with a drag and cope like any ordinary flask, but no bars are used in the cope, and hinges are placed on one corner of the drag and cope, while on the corner diagonally opposite, small latches or hooks are put on the outside, so that the flask may be removed from the sand after the mold is made and used again for another mold. Fewer flasks are required for snap work than for ordinary flask work, for in the former hundreds of molds may be made in one flask for the same cast, while in the latter a flask is required for every mold. Snap work can be made a great deal cheaper than flask work, because fewer flasks are required; but the snap mold cannot be used for heavy work, as the sand has not strength enough to resist the pressure of the molten metal in the mold when the flask is removed from it. For this reason the snap mold can be used only for very light castings, where the pressure of the molten metal is but slight.

After this short description of green-sand molding, I shall proceed to describe at length its various branches, with the fixtures belonging to each branch and the modes of making the molds for different kinds of castings.

The artesian well near the Providence depot, Boston, is progressing at the rate of 2½ feet a day, and has reached the depth of 1523 feet. The contract for the drilling was for the depth of 1500 feet, and the further extension of the work is a matter of uncertainty; it may go on or it may be stopped at any time. The work at the present time is through a very hard blue stone, which makes the rate of drilling very slow. At the depth of 1400 feet a 20-foot strata of gold quartz was passed. The object of the well is to find flowing water. If the owners were satisfied with a pumping well this would answer their purpose, for it is full of water within a few feet of the top, and would probably yield 500 or 600 barrels of water a day if properly piped and pumped.

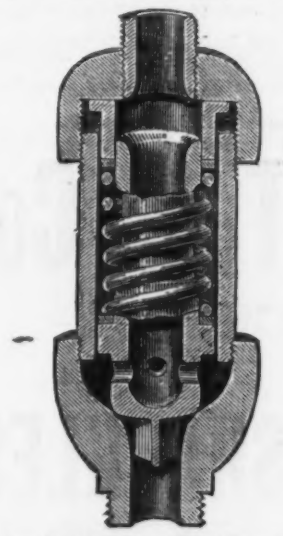
Relief or Safety Valve for Pipes.

The simple relief valve for feed pipes of steam boilers and other pipes liable to be subjected to great pressure, shown in the accompanying cuts, has been introduced by Messrs. Bateman, of East Greenwich, England. Its construction is quite simple. The valve is hollow, and the short piece of pipe in which it works serves for a guide as well as a case for the spring. The cap upon the top regulates the pressure, and at the same time carries the nipple to which the waste pipe is secured. Although intended in the first place for the feed pipes of steam boilers, it will be found equally applicable to service pipes, to which it will be a great protection

Relief or Safety Valves for Pipes.—Fig. 1.—Outside View.

against bursting and the shocks of spring and shutting faucets. The *English Mechanic* says of its application to feed pipes:

In the pipe leading from the feed pump to the boiler is inserted a T-piece, and to this is connected the relief valve. Being screwed to any desired pressure (say 100 pounds to the square inch) well within the strength of the pipes, the valve remains closed so long as the pressure in the boiler is below that point; but, if the pump throws more than the pipe can well carry, or if the water is turned off entirely or partially at the boiler,



Relief or Safety Valves for Pipes.—Fig. 2.—Section of Valve showing Hollow Valve and Spring.

the spring will yield, and allow the whole or part of the water to pass into the waste pipe. The latter should be arranged so as to discharge into the pump well, when no waste of water will occur; and the pump, if fixed to the engine, can always be allowed to work at full power (in which case alone can small pumps be depended upon). The amount of water delivered to the boiler depends on the shut-off valve fixed on the boiler itself; and the quantity supplied can be regulated to the utmost nicety according to the rate of evaporation, the excess passing back by the relief valve into the pump well. The discharging end of the valve is turned with a thread, so that a pipe may, if necessary, be attached to convey the water to the supply tank when it it is impossible to place the valve itself over the well.

Liability in Steam Boiler Insurance.

We have the following from Philadelphia, under date of October 23:

A suit which has attracted widespread attention by the novelty of the issue involved was decided by a jury this morning. It was a suit by Mrs. Henrietta Deitel, on behalf of herself and her four children, against the Hartford Steam Boiler Inspection and Insurance Company, to recover for the killing of her husband by the explosion of a boiler insured by the company named. The case has been on trial before a jury in Judge Finletter's court since October 12, and ended in the verdict of $9360 for the widow. The novelty of the case renders the facts of unusual interest. The boiler exploded on the morning of June 27, 1879. The company inspected it on May 14, 1879, and gave a certificate setting out that it could safely bear a pressure of 80 pounds to the square inch. The purpose of the plaintiff's counsel was to show that this was a negligent inspection. They alleged that the inspection was very hastily done; that they drove up a wagon with the pump, applied it to the boiler without delay, and began pumping while a man stood by watching the gauge. When the gauge had run up to about 120, the man said that was enough, and thereupon the pressure was taken off and the wagon drove away with the pump. The plaintiffs allege that the rules prescribed by ordinance of councils were not followed by defendant, who should have made a minute and careful examination of the boiler both inside and out; that the thickness of the sheets should have been carefully measured, and the gauges examined, as well as the condition of the riveting. All these precautions it was claimed the defendants failed to take. A number of experts were put upon the stand, and their testimony generally was that, in the condition the boiler was in, it could only stand a pressure of from 50 to 64½ pounds to the square inch, instead of 80, as the company had certified. If the boiler had been a perfect one, the experts thought a safe pressure would be 71 pounds. The plaintiffs' theory of the case was that the boiler had never been subjected to a higher pressure than 75 pounds, and John H. Nystrom, the expert, said that he thought that when the explosion took place the boiler was carrying a pressure somewhere around 70 pounds. On the part of the defense their main point was contributory negligence, and they called two witnesses to prove that fact.

The Lick Observatory at Mount Hamilton.

The report recently made by S. W. Burnham to the trustees of the "James Lick Trust" of observations made on Mount Hamilton, touching the advantages of that site for an astronomical observatory, sets at rest many questions which have been, to some extent, settled adversely in the public mind. An impression had prevailed that the site designated was not the best, and not such as practical astronomers would have chosen. It is possible that a more favorable site might have been found in the High Sierra, but it appears from the report made by astronomer Burnham that the best site in the Coast Range, or near the coast, has been chosen. The preliminary examination was thoroughly made and extends over a period of several months. Mount Hamilton is an isolated peak—like Mount Diablo in that respect. The scope of the horizon within astronomical survey is greater from the top of Mount Hamilton than from that of any other observatory in the United States. The altitudes of the highest point in the Coast Range are set down as follows: Mount Hamilton, 4250 feet; Loma Prieta, 3800; Mount Thayer, 3550; Block Mountain, 2800; Mount Diablo, 3853.

Mount Hamilton, it will be recollected, is 13 miles distant in an air-line easterly direction from San José and 26 miles distant by the new road which has been constructed to the top of the mountain. It is an isolated peak of what might be called the inner Coast Range. It overlooks the outer range and the ocean beyond. The observations made by astronomer Burnham covered the months of August, September and October of 1879. A temporary structure was erected, and a 6-inch refractor, giving about 400 powers, was used. During the first 37 nights the "seeing was first-class," with two exceptions. The classification for 60 days from August 17 to October 16, inclusive, is as follows: First-class nights, 42; medium nights, 7; cloudy and foggy nights, 11.

The dryness of the atmosphere was considered a great advantage. The clearness also at times was strikingly demonstrated by Prof. Davidson, who was able to see, from an elevation of 10,000 feet in the Sierra, with the naked eye, the flash of a 5-inch mirror of a heliotrope 175 miles distant. The vapor arising from the ocean is ordinarily about 2000 feet lower than the summit of Mount Hamilton, and consequently does not obstruct observation at that point. The average hight of the fog in the Coast Range is about 1500 feet, going sometimes as high as 2000 feet.

The astronomer furnishes no data for the winter months; but Prof. Davidson says that "there are no winter fogs as in summer, though occasionally one may form, but not as the summer fog does." Mr. Burnham affirms that even if nothing could be done in the winter, and the nights were as favorable in the dry season as he found them, Mount Hamilton would be much more desirable and more could be accomplished there with a large telescope than at any other place where an observatory has yet been established. "It is impossible to estimate the great discoveries which might be made and the important work done with a first-class object glass of 30 inches or more aperature, as perfect in all respects as the instrument at the Naval Observatory at Washington." It appears from this report that the best site for an astronomical observatory has been chosen within a reasonable distance of the State University, the former being an appurtenance of the latter. It is a better site than St. Helena, Mount Diablo or Loma Prieta, or any other which has been found in the inner or outer Coast Range.

A bridge across the Delaware, says the Philadelphia *Ledger*, between Philadelphia and Camden, must be looked forward to as one looks for the days when wars shall be no more, and all disputes shall be settled by arbitration. It is not likely to be built for many years to come, but the wonderful development that has taken place in Philadelphia within a generation warns us that it may come to be a necessity. The engineering difficulties of the project are small, compared with those bridging the East River, but, on the other hand, the advantages to come therefrom are also small by comparison. Until Philadelphia reaches a limit of growth on this side of the river, there is not likely to be an urgent demand for house room in New Jersey to be reached by the bridge, and Camden, though growing rapidly, is far too small to get up much of a demand for the bridge. The old project, however, has been again revived, councils having been asked for permission to erect such a structure, provided work is commenced within six years. If built at all within that time it will have to be done by private enterprise. The city cannot afford to do anything more in the way of costly construction of public works until the statue of William Penn is erected on a marble pile 500 feet high at Broad and Market streets, and the Public Building Commission has adjoured *sine die*.

The Iron Age Directory

and Index to Advertisements.

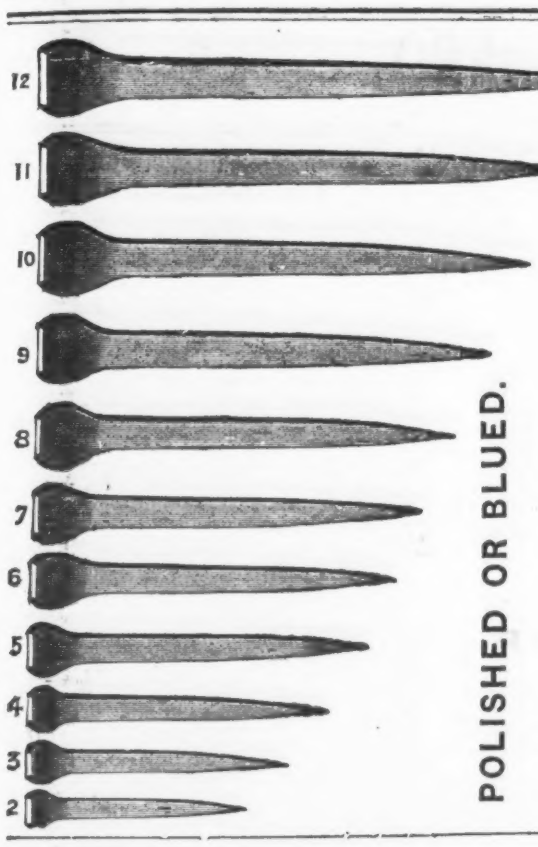
Self-Education for Workingmen.

The session of the Workingmen's College in London was opened on the 7th inst. with an address by James Russell Lowell, United States Minister to Great Britain. In the course of his remarks he said:

Few men knew how much was contained in the simple fact that one was able to read. A man who could read had got to a certain extent all that he needed to make him a scholar. A fellow-countryman of his who was once Minister to Berlin, who knew "little Latin and less Greek," was able, before he died, to translate not only the first part of "Faust," but the second, which was exceedingly difficult, and that was entirely by his own effort in educating himself. If some one were to offer to introduce them to the society of the loftiest intellects and the most select spirits of all time, they would think that was something worth giving a life for. If they were offered a letter of introduction which would persuade Shakespeare and Milton to give their best time and attention, they would say it was impossible. Yet that was precisely what the mere ability to read gave a man. They all had odds and ends of time, and it was precisely in the use of the odds and ends, and not of the great capital of time, that real wisdom was shown. Those who were able to read could choose their own society. They might choose good or indifferent, or even bad. There was a great deal of reading which was waste of time and worse—a kind of reading which enervated the attention and enervated the mind. Since he had been in the country he had seen people walking the streets reading, and reading in railway carriages, and he said to himself, "Here is a people desirous of improving themselves. In America, probably, they would be reading newspapers, but here they read books." But when he had been near enough to see what the book was! One great advantage that our forefathers had was that they had few books, and those were good books. Education was made from them. He was not speaking of scholars or pedants, but of the earlier men of culture of modern times. While our best books were within reach of every one, we were the center of a set of sentiment wires employed to catch the gossip of the earth—impertinent things that were of little importance to-day and none to-morrow. It was said of a man who mastered one book that he became a great bore, and one reason why he became a great bore was that he was so much superior to the people he was in the habit of meeting. He knew one book, and he knew that well. If they read the "Divina Comedia" of Dante they would find they had obtained a liberal education. They would have traveled. "Home-keeping youth have ever homely wits;" but they would have traveled in minds, and that was sometimes of greater advantage than traveling in foreign countries, especially if the minds were great ones, such as he had mentioned. He learned Italian entirely by his interest in Dante, and if they wished to learn a language he would advise them to take some great book. They would only need a dictionary; they would not need a grammar. His own experience was that nine out of ten learned a language better in this way than by learning the grammar. They were saved an infinite deal of drudgery, and also an infinite deal of time often spent on grammar to no purpose. If they wished to understand a great master they would soon find out the distinction between his indicative and subjunctive, and they would be led to it in an easier and more agreeable way than by the study of grammer. As Milton had said, great books were the true life-blood of master spirits. Goethe, in the second part of "Faust," elaborated the same idea. His friend Mr. Marsh, who was an eminent scholar, told him that a friend of his taught himself Danish in a little town of Vermont, and kept up a correspondence with Danish scholars, and when he went to Denmark they were surprised that he could not pronounce the language. For the pronunciation he admitted a master was desirable. He should advise them to make notes in order to mark their progress.

New Feed Grinder.—The Eagle Machine Works, of Cleveland, are manufacturing a new feed grinder for farmers' use which has several features of merit. It is arranged to be run by a single horse, without the aid of a horse-power, and can also be arranged, by putting on a pulley, to be run by a belt from a steam engine or other power. The grinder is claimed to be very durable, economical in its use of power and not to be liable to get out of order. The grinding mechanism consists of two burrs revolving in a vertical plane in the same direction, with one grinding burr, which is held stationary between them, with a grinding surface on each side and an opening in the top to admit the grain. The revolving grinding burrs are held against the stationary burr by a nut on the shaft with which they revolve, which can be tightened or loosened to grind fine or coarse. This arrangement decreases the friction resulting from using a single pair of burrs held together by a set screw, as the pressure resulting from the grinding between one of the revolving burrs and one face of the stationary burr, counterbalances the pressure between the other revolving burr and the other face of the stationary burr, and there is little friction caused by holding the two revolving burrs against the stationary burr, because they revolve with the shaft that holds them together. The grinder is not apt to clog, as the revolving burrs carry in the grain in proportion to the speed at which they run. It is stated that the grinder is easily managed, a boy being able to operate it. These grinders are reported to be very useful for grinding Graham flour and corn meal for house use, as well as grinding grain for stock.

M. Bartholdi, the able and patriotic sculptor of the Lion of Belfort, and of the magnificent statue of Liberty for New York roadstead, has conceived the project of devoting a monument to commemoration of the balloons which rose from Paris during the siege. The design (of which *La Nature* gives an engraving) represents, on a pyramidal base, a balloon in act of rising, while round its lower part several figures are skillfully grouped; one of these, a mother with infant on her knee, is bidding the æronaut adieu. At the four corners of the pedestal are sculptures representing the carrier pigeons which so happily completed the circle of the aerial post. A model of this monument has been prepared by M. Bartholdi in plaster.



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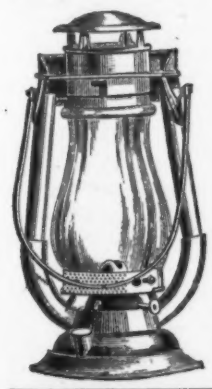

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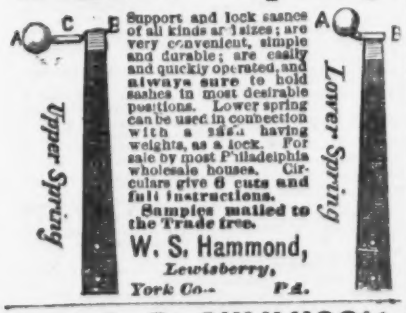

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SOUTHERN PATTERN GRAIN CRADLES, 4, 5 and 6 fingers.

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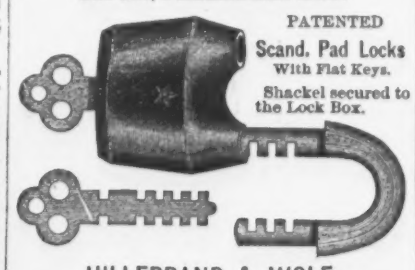

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Cook's, Douglass Mfg. Co .... dis 40&10 %
Snell Mfg. Co.'s C. S. Augers .... dis 40 %
" " B. Machine .... dis 40 %
" " C. S. Bits .... dis 40 %
" " Jennings' Bits .... dis 35 %
Patent Solid Head .... dis 30 %
Lewis' Patent Single Twist .... dis 33⅓
Russell Jennings' Auger Dowel, Machine-Dowel and Hand-Rail Bits .... dis 10&10&10 %
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Russell Jennings' Car and Machine Bits, Boring-Machine and Millwrights' Augers dis 25&10&10&10 %
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Ives' "Jennings" Bits .... dis 33⅓&10 %
Andrews Bits .... dis 40 %
Expansive Bits, Clark's, small, $18; l'ge, $26 .... dis 25 %
" Ives .... $20 @ $30—dis 33⅓ %
" Blake's .... $20—dis 40 %
" Parmelee's .... $20 and $30 .dis 33⅓ %
Hollow Augers Ives' / French Swift & Co .... } dis 15 %
" " Douglas .... dis 15 %
" " Bonney's Adjust .... ⅌ doz $48—dis 25&10 %
" " Stearns' Adjust., ⅌ doz $48—dis 20&10 %
" " Ives' Expansive ...each $4.50—dis 30 %
" " Univ'sal Expansive, each $4.50—dis 20 %
Woods .... dis 25 %
Gimlet Bits .... $7.50 ⅌ gross, dis 45 %
" Diamond .... ⅌ doz $1.10 dis 20&10 %
" "Bee" .... dis 35&5 %
Double Cut Gimlet Bits Shepardson's .... dis 40 %
" " Ct. Valley Mfg. Co ... dis 30&10 %
" " Hartwell's .... dis 60&10 %
" " Douglass' .... dis 40 %
" " Ives' .... dis 50 %
Morse' Bit Stock Drill .... dis 25 %
L'Hommedieu's Ship Augers .... dis 15 %
Watrous Ship Augers .... dis 15 %
" Extension Lip .... dis 30 %

Awl Hafts.
Sewing Brass Ferrule .... $3.50 ⅌ gross—dis 40&10 %
" .... 3.50 " dis 40&10 %
Patent Sewing, Short .... $1.00 ⅌ doz—dis 40&10 %
" " Long .... $1.40 ⅌ doz—dis 10 %
Patent Peg Plain Top .... $10.00 ⅌ gross—dis 40&10 %
" " Leather Top ..... 12.00 " dis 40&10 %

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Awls Sewing, Common .... ⅌ gross $1.70—dis 25&10 %
" Shouldered Peg .... ⅌ gross 2.45—dis 25&10 %
Patent Peg .... ⅌ gross .63—dis 25&10 %
Shouldered Brad .... ⅌ gross $2.70—dis 25&10 %
Handled Brad .... $7.00 ⅌ gross—dis 20&10 %
Handled Scratch .... $7.00 ⅌ gross—dis 20&10 %
Socket Scratch .... $1.00@$1.25 ⅌ doz—net
Brad Sets, Aiken's .... ⅌ doz $12.00—dis 45&10 %
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" " No. 2, 4.80 ... dis 20&10 %
" " No. 3, 7.80 ... dis 20&10 %

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" 4½ to 6 and over .... ⅌ doz $11.50 net
" Beveled .... 50 c ⅌ doz advance
Double Bit, 4½ to 5½ and under .... ⅌ doz $21.00 net
" 4½ to 6 and over .... ⅌ doz $23.00 net
" Beveled .... $1.00 ⅌ doz advance

Axle Grease.—Fraser's .... ⅌ ℔ 6c

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All Spring Balances .... dis 15&10 %

Bells.
Hand, Light Brass .... dis 60&10 %
" Extra Heavy .... dis 45 %
" White Metal .... dis 60 %
" Silver Chime .... dis 20&10 %
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Gong, Abbe's .... dis 45&10 %
Yankee .... dis 30&10 %
Barton's .... dis 30&10 %
Crank Taylor's .... dis 25&10 %
Brook's .... dis 50&10&2 %
Cone's .... dis 10 %
Connel's .... dis 35 %
Lever, Sargent's .... dis 60&10 %
" Taylor's Bronze or Plated Lever .... net
" " Japanned Lever .... dis 25&10 %
" R. & E. M. Co.'s .... dis 50&10&2 %
Pull, Brook's .... dis 50&10&2 %
" Western .... dis 25&10 %
Call .... dis 25 %
Cow, Common Wrought .... dis 40&10&10 %
" Western .... dis 20&10 %
" Sargent's new list .... dis 40&10&10 %
" Kentucky "Star" .... dis 20&10 %
" Sargent's new list .... dis 40&10&10 %
Dodge's Genuine Kentucky, new list—
Nos. 0 1 1½ 2 3 4 5 6 Hog } dis 50 %
$12.00 10.00 9.00 8.00 6.00 5.00 3.50 2.50 5.00
Texas .... dis 30&10

Bellows.
Blacksmiths', Common .... dis 45 %
Extra and Pittsburgh Pattern .... dis 20 %
Moulders .... dis 25 %
Hand Bellows .... List of Dec. 1, 1879, net

Belting, Rubber.
N. Y. Belting and Packing Co .... new list net

Bit Holders.
Extension, Barber's .... ⅌ doz $15.00—dis 40&5 %
" Ives' .... ⅌ doz $15.00—dis 40 %
Diagonal .... ⅌ doz $24.00—dis 40 %
Angular .... ⅌ doz $24.00—dis 40 %

Blind Adjusters.—Domestic .... ⅌ doz $3.00, dis 15 %

Blind Fasteners.
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Van Sand's .... No. 2000, per gross, $10.00 ... dis 15 %
" old pattern .... ⅌ gross, $9.00 net
Washburn's Patent .... ⅌ gross $10.50 net
Merriman's .... new list net
Mackrell's .... ⅌ doz. pairs, $0.65, dis. 10 %

Blind Staples.
Barbed, ⅝ in. and larger .... ⅌ ℔ 12c net
" ⅜ in .... ⅌ ℔ 16c net

Blocks.
Differential Pulley Blocks .... dis 20 %
Penfield Block Works, Rope and Iron Strap'd ... dis 40 %
Wrot. Iron Com. bushed ... dis 25 %
all steel roll'r ... dis 10 %
Sheaves ... dis 35 %
Stanley R. & L. Co., Rope and Iron Strap'd ... dis 40&10 %

Bolts
Cast Iron Barrel, Shutter, &c .... dis 60&10 %
Cast Iron Chain (Sargent's list) .... dis 60&10&10 %
Bush's Lever and Chain Bolts .... dis 40 %
Ives' Pat. Door Bolts .... dis 40 %
Wrought Barrel .... dis 55&10 %
" Square .... dis 55&10 %
" Shutter, all Iron, Stanley's list ... dis 50&10 %
" " Brass Knob, " " ... dis 20&10 %
" " Sargent's list .... dis 55&10 %
" Sunk Flush, Sargent's .... dis 66⅔&10 %
" " Stanley's .... dis 40&7½ %
" B.K.Flush, Com'n, Stanley's .... dis 50&6 %
" " Ex. Heavy. " .... dis 40&10 %
" Plated Knob & Slide Flush " ... dis 50&2½ %
Carriage and Tire, Common .... dis 75&10 @ 80 %
" " Philadelphia, new list .... dis 55 %
" " Philada. Pattern ... dis 70 @ 70&10 %
Shelton's .... old list, dis 60&10 %
R. B. & W. Carriage (old list) .... dis 65 %
Tire, Am. Screw Co.'s Phila, new list, Nov 1, '79, dis 60 %
" "Bay State" .... dis 60 %
" R. B. & W., new list .... dis 60 %
Stove—American Screw Co.'s .... dis 37½ %
" R. B. & W .... dis 40 %
Plow .... dis 40 %
" R. B. & W .... dis 40 %
Machine .... dis 65 %
Bolt Ends " .... dis 45&5 %

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Boring Machines. Upright. Angular.
First quality no Augers ... $5.50 $6.75 ... dis 40 %
Phillips' with Augers .... 6.50 7.00 net

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Wilson Mfg. Co .... dis 10 %
Barber's .... dis 40&5 %
Spofford's Patent .... dis 50&5 %
Noble's Patent .... dis 40&5 %
Ives' Patent Braces .... dis 50&10 %
Common Ball (American) .... dis 10&10 %
Amidon's .... dis 50 %
Barker's Impd .... dis 40 %
Empire .... dis 30 %
Buffalo Ball .... dis 40 %

Brackets.—Shelf (Sargent's) .... dis 60&10 %

Bright Wire Goods list of Dec. 15, 1879, dis 60&10 %

Bull Rings.—Union Nut Co .... dis 50&2 %
Sargent's .... dis 65&10 %
Hotchkiss' .... low list dis 35%
Humason, Beckley & Co.'s .... dis 60&10 %

Butts.
Wrought Brass .... dis 45 %
Cast Brass, Tiebout's .... dis 30 %
Corbin's .... dis 40&10 %
Fast Joint, Narrow .... dis 40&10 %
" Broad .... dis 40&10 %
Loose Joint .... dis 50&10 %
" Japanned .... dis 50&10 %
" with Acorns .... dis 45&10 %
" Japanned, with acorns .... dis 55&10 %
Parliament Butts .... dis 60&10 %
Mayer's Hinges .... dis 55&10 %
Loose Pin no Acorn .... dis 50&10 %
" Acorns .... dis 50&10 %
" Japanned .... dis 55&10 %
Plated Tips .... dis 55&10 %

WROUGHT IRON.
Fast Joint Narrow .... dis 40&10 %
Lt. Narrow .... dis 40&10 %
Broad .... dis 40&10 %
Loose Joint, Broad .... dis 50&10 %
Table Butts, Back Flaps, &c .... dis 40&10 %
Inside Blind, Regular .... dis 25&10 %
" Light .... dis 40&10 %
Loose Pin, Wrt .... dis 50&10 %
Spring Hinges
American Spiral Spring Butt Co., Jap'd .... dis 25 %
" " " " Fancy .... dis 20 %
Gem Spiral Spring Butts, Japanned .... dis 25 %
" " " " Ornamental .... dis 20 %
Geer's Spring and Blank Butts .... dis 25 %
Sabin Mfg. Co.'s Double Acting .... dis 35 %
Union Spiral Spring, Japanned .... dis 25 %
" " Ornamental .... dis 20 %
Union Spring Hinge Co.'s .... dis 25 %
American Spring Hinge Co.'s .... dis 25 %
Union Mfg. Co .... dis 25 %
Bommer's .... dis 25 %
Blind Butts, Parker .... dis 60&10&10 %
Palmer .... dis 35&10 %
Seymour .... dis 60&10 %
" Shepard's "Double Locking" Nos. 1 & 2 .... dis 6 &10&10 %
Shepard's "Noiseless," Nos. 50 & 60 .... dis 6 &10&10 %
" Lull & Porter .... dis 60&10 %
" Nicholson .... dis 45&10 %
" Huffer .... dis 45 %
" Clark's, Nos. 1, 3, 5 .... dis 60&10&10 %
" Sargent's No. 12 .... dis 7 &10 %

Bow Pins.
Hotchkiss' .... low list net
Humason, Beckley & Co.'s .... dis 60 %
Sargent & Co.'s .... $19.70 and $21.10, dis 60&10 %

Butchers' Cleavers.
Humason & Beckley Mfg. Co .... dis 20 %
Bradley's .... dis 25 %
Beatty's .... dis 25&5 %

1	2	3	4	5	6	7	8
$16.50	19.00	21.50	24.00	27.00	30.00	33.50	36.50

Can Openers.
Messenger's Comet .... ⅌ doz $3.00, dis 25 %
American .... ⅌ doz $2.00, dis
Duplex .... ⅌ doz 25c, dis 15@20 %
Lyman's .... ⅌ doz $3.75, dis 20 %
No 4, French .... ⅌ doz $2.25, dis 50 %
No. 5, Iron Handle .... ⅌ gross $7.50 dis 10 %
Eureka .... ⅌ doz $2.50, dis 10 %
Sardine Scissors .... ⅌ doz $7.00, dis 55 %
Star .... ⅌ doz $5.00, dis 10 %
Sprague .... dis 50 %

Caps—Percussion, ⅌ 1000.
U. M. C., F. C. trimmed .... 50c } dis
" F. L. ground .... 70c } 10&5 %
U. M. C. Cen. fire ground .... 70c } dis
" Double W. proof .... $1.40 } 10&5 %
G. D. & S. B .... 36c, dis 7½ %
Double Waterproof, in 1-10's .... $1.40 } dis
Colt's Pistol, " .... 70c } 10&5 %
F. L .... 50c } dis 10&
E. B. 1-10, Trimmed .... 60c }
E. B. 1-10 Ground Edge .... 70c } 5 %
Musket, in 1-10's .... 75c net

Cartridges.—Rim .... dis 60&10 %
Central Fire .... dis 20 %

Cards.—Horse and Curry .... dis 10 %
Cotton .... dis 10 %
Wool .... dis 10 %

Carpet Stretchers.
Cast Steel, Polished .... ⅌ doz $5.00, dis 30
Iron Steel Points .... ⅌ doz $2.00, dis 35 %
Bullard's .... dis 25 %

Casters.
Bed .... new list July, '80, dis 25&10 %
Plate and Shallow Socket " " dis 25&10 %
Deep Socket .... " " dis 25&10 %

Cattle Leaders.
Humason, Beckley & Co.'s .... dis 65&10 %
Sargent's .... dis 65&10 %

Chain.
Trace, 6½-1-2 .... ⅌ pair 79c }
" 6½-10-3 .... ⅌ pair 70c } dis
" 7-10-2 .... ⅌ pair 86c }
German Halter Chain, New list Oct. 22, '79 .... dis 40 %
" Coil, New list Oct. 22, '79 .... dis 40 %
Covert Halter, Hitching and Breast .... dis 35%
Oneida Halter Chain .... dis 40 %
Galvanized Pump Chain .... ⅌ ℔ 10c net
Jack Chain, Iron .... dis 50 %
" Brass .... dis 40 %

Chalk.
White .... ⅌ gross 60c net
Red .... ⅌ gross 80c net
Blue .... ⅌ gross 100c net
White Crayons .... ⅌ gross 10c net

Chisels.
Socket Framing, Crossman .... dis 65&5 %
" " Buck Bros .... new list, dis 22½ %
" " Merrill .... dis 65&10 %
" " Witherby Tool Co .... dis 65&10 %
" " Douglass' .... dis 65&10 %
" Firmers, Crossman .... dis 65&5 %
" " Buck Bros .... new list, dis 22½ %
" " Merrill .... dis 65&10 %
" " Witherby Tool Co .... dis 65&10 %
" " Douglass' .... dis 65&10 %
" Corner .... dis 65&10 %
Tanged Firmers extra .... dis 33⅓@40 %
" Butcher's .... $5.00 @ $5.25 to
" Spear & Jackson's .... 5.00 to
" Buck Bros (Shank) 5.25

Clamps.
Iron, Providence Tool Co.'s, Wrt. Iron .... dis 25 %
Adjustable, Gray's .... dis 20 %
" Lambert's .... dis 20 %
" Snow's .... dis 40&5 %
" Hammer's .... dis 15 %
" Stearns' .... dis 15&10 %
Cabinet, Sargent's .... dis 65&10 %
Carriage Makers', Sargent's .... dis 65&10 %
Cord and Tape (T. & S. Mfg. Co.) .... dis 30 %

Clips, Axle.
Norway or Best .... dis 40&10%
Superior .... dis 45&10 %

Coal Hods.
Griffiths .... dis 33⅓ %

Cockeyes .... dis 25 %

Cocks, Brass.
Racking .... new list, July 10, '80 }
Globe .... " " }
Plain Bibbs .... " " } ... dis 40 %
Ale and Beer .... " " }

Coffee Mills.
Board and Box .... new list, Jan., 1880, dis 35 %
Increase Wilson's .... net
Selsor's Pat .... $9.50, $10.50, dis 25%
American (Enterprise Mfg. Co.) .... dis 20%
French Steel .... dis 20 %
The Swift (Lane Bros.) .... dis 0 %

Combined Dinner Pail and Lantern.
Per doz $18.00 .... dis 30 %

Compasses, Dividers, &c.
Compasses .... dis 45&10 %
Callipers .... dis 45&10 %
Dividers .... dis 45&10 %
Bemis & Call Co.'s Dividers .... dis 60&5 %
" " Compasses & Callipers ... dis 50&5 %
" " Wing & Inside or Outside dis 50&5 %
" " Double .... dis 60 %
" " Call's Pat. Inside .... dis 30 %
Cook's .... dis 25 %
Excelsior .... dis 50 %
Miller's Patent .... dis 25 %

Coopers' Tools.
Bradley's .... dis 15 @ 20 %

Corkscrews.—Humason & B .... dis 33⅓ %
Clough's Wire .... dis 25 %

Corn Knives and Cutters.—Bradley's ... dis 10 %
Wadsworth's .... dis 33⅓ %

Crow Bars.
Cast Steel .... ⅌ ℔ 8¼c
Iron, Steel Points .... ⅌ ℔ 6¼c

Curling Irons, &c.
⅝, ¾, ⅞ in., $1.80 2.00, 2.40 .... dis 10 %
Curling Tongs .... ⅌ doz $3.65, dis 10 %
Pinching Irons .... ⅌ doz 7.50, dis 20 %

Curry Combs.
Fitch's (List of No. 240, $1) .... dis 40 %
Hotchkiss Novelty .... new list, July, 1880, dis 25 %
" Exclr. Supr. Champion .... dis 25 %
Lawrence .... new list, July 1880 dis 25 %
Lawrence, with detachable Mane Comb new list July 1880, dis 25 %
Rubber .... ⅌ doz $10.00, dis 15 %

Curtain Pins.—Silvered Glass .... net
White Enamel .... net

Cutlery.
Meriden Cutlery Co. (Table) .... net
Am. Miller Bro.'s Cutlery Co .... dis 25 %
Humason & Beckley, Pocket .... dis 33⅓ %
The Wm. Rogers Mfg. Co .... net
Naugatuck Cutlery Co .... list net
Aaron Burkinshaw's Pocket .... dis 25 %

Dog Collars.
Embossed Gilt .... dis 20 %
Leather .... dis 30 %
Brass .... dis 25 %

Door Springs.
Torrey's Rod .... ⅌ doz $2.10, dis 10 %
Gray's " .... ⅌ doz $1.70, net
Bee Rod .... ⅌ doz $1.70, net
Gem (Coil)—
No. 1, Large, Japanned .... ⅌ doz $3.50 }
No. 2, Medium, ... ⅌ doz 2.50 } list net
No. 3, Small. .... ⅌ doz 2.00 }
Challenge (Coil)— Nos. 9 7 6
Japanned .... ⅌ doz $2.00 2.50 3.50 }
Coppered .... ⅌ doz 4.00 4.50 5.00 }
Galvanized .... ⅌ doz 3.50 4.00 4.50 } dis 10 %
Nickeled .... ⅌ doz 5.50 6.00 7.00 }
Star (Coil)—For Cop'd, Nickel-Plated, &c. see list.
No. 4, ("Shoo Fly") Screen door size ⅌ doz $1.80 }
No. 5, Screen Door Size .... ⅌ doz $2.00 }
No. 6, Medium .... ⅌ doz 2.50 } dis 20 %
No. 7, Large. .... ⅌ doz 3.50 }
Sabin's Lever ..No. 1, $1; 2, $1.50; 3, $2; 4, $2.50; dis 30 %
Sabin's Boss ....No. 1, $5.40; 2, $4.20; 3, $3.00, dis 50 %
Sabin's Crown .... ⅌ doz $2.75, dis 50 %
Philadelphia .... 5 in., $5.00; 8 in., $7.00, dis 35 %
Barker's Concealed .... dis 20 %
Cowell's ... No. 1, $18.00; No. 2, $15.00 ⅌ doz, dis 50 %
Rubber, complete .... ⅌ doz $1.80, dis 10 %
Hercules .... dis 40 %

Drawing Knives.
Crossman's No. 1 .... dis 65&5 %
Merrill .... dis 65&10 %
Nobles Mfg. Co .... dis 15 %
Bradley's .... dis 35 %
Adjustable Handle .... dis 20 %
Witherby Tool Co .... dis 65&10 %
Douglass .... dis 65&10 %

Drills and Drill Stocks.
Blacksmiths' .... each $2 70 net
Blacksmiths Self Feeding .... each $7.50, dis 20 %
Breast P. S & W .... dis 20 %
" Hotchkiss .... dis 20 %
Breast, Wilson's .... dis 20 %
" Miller's Falls .... each $3.00, dis 25 %
Bartholomew's .... each, $2.50 dis 25&10 %
Ratchet, Merrill's .... dis 10 %
" Ingersoll's .... dis 25 %
" Whitney's .... dis 20 %
" Weston's .... dis 20 %
Moore's Triple Action .... dis 20 @ 25 %
Whitney's Hand Drill .... dis 50 %
Wilson's Drill Stocks .... dis 10 %
Automatic Boring Tools .... each $2.25, dis 20 %

Drill Chucks.—Morse's Beach Patent ...... dis 30 %
" Adjust..each $10.00, dis 30 %
Danbury .... $8.00, dis 30 %

Egg Beaters.
Dover .... ⅌ doz. $2.50 net
National .... ⅌ doz $4.50, dis 33⅓ %
Family .... per gross $15; per doz., $1.50 net

Elevator Buckets.
Mill E. Buckets, light, 3½ to 10 in. (Duc's Improved) ⅌ 100 $15.00 @ $54.00, net
Mill E. Buckets, heavy, 5 to 10 inches (Duc's Improved) ⅌ doz $5.60 @ $10.20 net
Storehouse, (Duc's Patent) 12 to 17, $12.00 @ $20.00...net

Emery and Emery Paper.
Genuine Chester—Regular Nos .... ⅌ ℔
" " Flour and FF .... ⅌ ℔
" " in 10-lb. cans. .... 2c extra
Washington Mills—Regular Nos .... ⅌ ℔ 8c
" Flour .... ⅌ ℔ 4c
Excelsior Mills, Regular Nos., Grain in kegs .... ⅌ ℔ 6c
" " " Flour and FF " .... ⅌ ℔ 4c
" " " 10-lb. cans .... ⅌ ℔ 9c
Wellington Mills, Grain .... ⅌ ℔ 10c net
" " Flour .... ⅌ ℔ 8c net
Hampden Emery Grain .... 5c net
" Flour .... 3c net
B. & A. Emery Paper .... dis 20@25 %

Enameled and Tinned Ware.
Kettles .... 45 %
Sauce Pans .... dis 30 %
Tinned Sauce Pans .... dis 30 %

Escutcheon Pins.
Iron .... dis 20 %
Brass .... dis 45 %

Escutcheons.
Door Lock .... Same discounts as Door Locks
Brass Thread .... dis 55 %
Wood .... dis 25 %

Faucets.
Fenn's .... dis 40 %
Fenn's Cork Stops .... dis 33⅓ %
Star .... dis 55&10 %
Frary's Patent Petroleum .... dis 20&10 %
Wood and Metallic .... dis 40 %
West's Patent Key .... dis 45 %
Metallic Key, Leather Lined .... dis 50 %
Cork Lined .... dis 70 %
Enterprise (Self Measuring) .... ⅌ doz, $36.00, dis 20 %

Felloe Plates .... ⅌ ℔ 100, dis 10 %

Files.
Auburn .... $5.00 to £, dis 35 %
Arcade .... $5.00 to £, dis 20 %
Black Diamond, new list .... dis 30 %
E. M. Boynton's .... new list, dis 25 %
Nicholson .... (Nicholson List) dis 30 %
Madden & Cockayne File Co .... dis 20 %
Heller & Bros new list) .... dis 15 %
Hiscox File Mfg. Co., new list .... dis 20 %
J. & Riley Carr .... 4.50 to £
Johnson & Bro .... dis 30 %
Butcher's .... 4.50 to £
Walter Spencer & Co.'s "Diamond" .... 4.50 to £
Fisher's .... 4.75 to £
Moss & Gamble .... 4.50 to £
H. Disston & Sons (new list) .... dis 30 %
Western (new list) .... dis 20%
Limet & Co. (French) .... $4.25 to £
Union File Works (new list) .... dis 30 %

Fluting Machines.
Knox, 4-inch Rolls .... $3.25 each }
" 6 " " .... 4.00 " } dis 10 %
" 8 " " .... 6.50 " }
Peerless, 4-inch Rolls .... 4.00 each net
" 5 " " .... 4.75 each net
Eagle, 3½-inch Roll .... $2.15, dis 10 %
" 5½ " " .... $2.85, dis 10 %
Eureka, No. 1, 7-inch Roll .... 6.00 each, dis 10 %
" No. 2 5-inch Roll .... 4.00 each, dis 10 %
Crown, 4½-in. $3.50; 6-in., $4.00; 8-in., $6.50 each dis 10 %
Star .... 4½ in., $4.00; 6 in., $5.00 each dis 10
Crown Jewel .... 6 in., $3.40 each, dis 10 %
American, 5 in., $3; 6 in., $3.40; 7 in., $4.50 each, dis 10 %
Domestic Fluter .... 1.50 each net
Geneva Hand Fluter, No. 1 .... ⅌ doz $15, dis 20 %
Crown Hand Fluter, Nos. 1, $15.00; 2, $12.50; 3, $10.00 ⅌ doz .... dis 10 %
Shepard Hand Fluter .... No. 75 ⅌ doz $15, dis 10 %
" " " No. 90, $9.00; No. 110, $7.25;
" " " No. 100, $6.00 ⅌ doz .... net
Clark's Hand Fluter .... ⅌ doz $15.00, dis 20 %
Combined Fluter and Sad Iron .... ⅌ doz 15.00, dis 30 %
Buffalo .... ⅌ doz 10.00, dis 10 %

Fluting Scissors .... dis 45 %

Forks.
Hay, Manure and Spading .... dis 40&5 %
Plated "A 1, Rogers & Bro .... dis 33⅓&5 %
" Reed & Barton .... dis 33⅓&5 %

Fruit and Jelly Presses.
Enterprise Mfg. Co .... dis 20 %
American .... dis 20 %

Fry Pans.
Burnished, list as follows .... dis 55 %

No.	0	1	2	3	4	5	6	7	8
⅌ doz	$3.00	$3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00

"Acme" .... dis 45 %

Gauges.
Marking, Stanley's .... dis 45&10 %
" Chapin's .... dis 50&10 %
Wire .... dis 10 %
" Smith's Patent .... ⅌ doz 18.00, dis 40 %

Gimlets.
Nail and Spike .... dis 45 %
"Bee" Gimlets .... ⅌ gross $12.00 dis 6.&10 %
"Eureka Gimlets .... dis 50 %
"Diamond Gimlets .... dis 40 %
Double Cut Shepardson's .... dis 40 %
" " Hartwell's .... dis 50 %
" " Ives' .... dis 50 %
" " Douglass' .... dis 40%

Glue Pots.
Tinned and Enameled .... dis 30 @ 35 %
Family, Howe's "Eureka" .... dis 40 %
" L. F. & C.'s "Handy .... dis 25 %

Grindstone Fixtures.
Sargent's Patent .... dis 65&10 %
Reading Hardware Co., new list .... dis 25&10 %
" " "Keystone" .... dis 25&10 %

Gun Wads.
U. M. C. B. E. 11 up .... $2.00 }
" " 9 & 10 .... 2.30 }
" " 7 & 8 .... 2.00 }
" P. E. 11 up .... 3.10 } dis 5&5 %
" " 9 & 11 .... 4.00 }
" " 7 & .... 4.00 }

Halters.
Covert's Pat. Rope .... dis 50 %
Horse and Cattle Ties, Covert's .... dis 50 %

Hammers.
Maydole's .... dis 15 %
Cheney's .... dis 25 %
H. Hammonds (new list July 20, '80) .... dis 20 %
Humason & Beckley .... dis 50 %
Verree .... dis 5 %
Magnetic Tack, Nos. 1, 2, 3, $1.25, 1.50 and 1.75 dis 20&10 %
Warner & Noble's .... dis 10 %
Kip's (old list) .... dis 20 %
Yerkes & Plumb .... dis 15 %

Hand Cuffs and Leg Irons.
Providence Tool Co.'s Hand Cuffs, $15.00 ⅌ doz } dis 10 %
" Leg Irons, $25 ⅌ doz }
Tower's .... dis 25 %

Handles.—Door or Thumb Latches—
Nos. 0 1 2 3 4
Per doz ... $0.80 1.00 1.18 1.35 1.50 ... dis 55&10 %
Roggin's Latches .... per doz 50c@40c net
Bronzed Iron Drop Latches .. ⅌ doz $0.90 @ 1.15 dis 10 %
Jap'd Store Door Handles—Nuts, $2.00; Plate $1.35 no Plate, $1.08 .... dis 10 %
Barn Door .... per doz $1.80, dis 10 %
Wrought Chest .... dis 60&10 %
Surface Chest, Sargent's list .... dis 60&10 %
Flush Chest .... dis 60&10 %
Lifting .... dis 55&10 %
Saw and Plane .... dis 40&10 %
Boynton's Pat. Loop Saw Handles .... dis 25 %
" Centennial Saw Handles .... dis 25 %
Hammer and Hatchet .... dis 20 %
Brad Awl .... ⅌ gross $2.00, dis 20&10 %
Hickory Firmer Chisel, assorted, ⅌ gross $4.50
" " " large, " 5.00
Apple " " assorted, " 5.00
" " " large, " 6.00
Socket " " assorted, " 3.00 } dis 20&10 %
" Framing " assorted, " 5.00
File, assorted, ⅌ gross 2.75
Auger, assorted, ⅌ gross 6.00
" large, ... 7.00
Patent Auger, Ives' .... dis 25
" Douglass' .... ⅌ set $1.25, net
" Swan's .... ⅌ set $1, net

Hangers.
Barn Door, old patterns .... dis 50&10 %
" New England .... dis 60&10 %
Novelty .... dis 40 %
Challenge .... dis 50 %
Climax (Anti-Friction) .... dis 50 %
Sterling Improved (Anti-Friction) .... dis 60&10 %
Cheritree .... dis 50 %
Kidder's .... dis 40 %

Harness Snaps.
Henshaw's ... List of 1¼ changed to 14 00, dis 50&10 %
Judd's ...... " " " 14.00, dis 50&10 %
Fitch's (Bristol) " " 14.00, dis 50&10 %
Hotchkiss' .... dis 10 %
Andrews' .... dis 50 %
Sargent's .... dis 60&10 %
"German .... dis 60&5 %
Covert .... dis 40 %

Hatchets.
Isaiah Blood .... dis 15 %
Shingling, Nos. 1 2 3 .... ⅌ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 .... ⅌ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 .... ⅌ doz 7.50 8.00 8.50
Hunt's .... dis 15&5 %
Shingling, Nos. 1 2 3 .... ⅌ doz $7.25 $8.00 $8.75
Claw, Nos. 1 2 3 .... ⅌ doz 7.75 8.50 9.25
Lathing, Nos. 1 2 3 .... ⅌ doz 7.50 8.25 9.00
Hurd's .... dis 33⅓
Shingling, Nos. 1 2 3 .... ⅌ doz $8.00 $8.50 $9.00
Claw, Nos. 1 2 3 .... ⅌ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 .... ⅌ doz 8.00 .50 9.00
Yerkes & Plumb .... dis 15 %
Shingling, Nos. 1 2 3 .... ⅌ doz $7.50 $8.00 $8.50
Claw, Nos. 1 2 3 .... ⅌ doz 8.25 8.75 9.25
Lathing Nos. .... ⅌ doz 7.50 8.00 8.50
Simmons's .... dis 20
Shingling, Nos. 0 1 2 3 ... ⅌ doz $7.50 $8.00 $8.50 $9.00
Claw, Nos. 1 2 3 ... ⅌ doz 9.00 9.50 10.00
Lathing, Nos. 1 2 3 ... ⅌ doz 8.00 8.50 9.00
Broad, Nos. 1 2 3 4 ... ⅌ doz 9.00 10.00 12.00 14.00
" Nos. 5 6 7 8 ... ⅌ doz 16.00 18.00 20.00 22.00
Collins .... dis 10 %
Shingling, Nos. 1 2 3 .... ⅌ doz $6.00 $6.50 $7.00
Claw Nos. 1 2 3 .... ⅌ doz 6.50 7.00 7.50
Lathing, Nos. 1 2 3 .... ⅌ doz 6.00 6.50 7.00

Hay Knives.
"Lightning" .... ⅌ doz $20.00 net
Wadsworth's .... dis 33⅓

Hinges.
Gate, Western .... ⅌ doz $6.25, dis 60 %
" N. E .... ⅌ doz $10.15, dis 60&5 %
" N. E. Reversible .... ⅌ doz $6.50, dis 60
Gate, Clark's No. 1 .... ⅌ doz $0.00, dis 50 %
" N. Y. State .... ⅌ doz $0.50, dis 60 %
" Automatic .... ⅌ doz $12.50 dis 40 %
" Common Sense .... dis 10 %
" Seymour's .... dis 40&10 %
" Shepard's .... Nos. 10, 20 & 25, dis 50 %
Rolled Blind Hinges .... dis 60&10 %
Rolled Plate .... dis 60&10 %
Rolled Raised .... dis 60&10 %
Wrought Strap and T, list Dec. 20, '77 .... dis 45&10 %
Plate Hinges { 8, 10 & 12 in. $6.50 ⅌ 100 ℔ }
"Providence" { over 12 in. $5.20 ⅌ 100 ℔ } .... dis 10 %
Screw Hook and { 8, 10, 12 in., $6.75 ⅌ 100 ℔ }
Strap .... { 14 to 36 in., $5.50 ⅌ 100 ℔ } dis 10 %
Heavy Welded Hook { 8 to 12 in. $0.75 ⅌ 100 ℔ }
{ 14 in. & up, $.50 ⅌ 100 ℔ } dis 10 %
Screw Hook and Eye .... { ⅝ & 1 in., 9c; ¾ in., 9c; ⅝ in., 10c; ½ in., 12c } dis 20 %

Hoes.—Riveted Shank .... per doz, $5.00; dis 35 %
Socket .... ⅌ doz $5.25, dis 35 %
Grub .... dis 15 %
Planters' .... dis 35 %
Scovill Pattern .... dis 33⅓ %
Scovill Pattern, Handled .... dis 25 %
Hick's Pat. Solid C. S. Planters' .... dis 20&10 @ 30 %
" Scovill Pattern dis 20&5 @ 35 %
Winsted & Lane, Planters .... dis 25 %
" Scovill Pattern .... dis 20@25 %

Hooks.
Bird Cage, Sargent's list .... dis 60&10 %
Cotton .... dis 50 %
Cotton, Patented (N. Y. Mallet & Handle Wks), dis 30
Cotton (Humason & Beckley Mfg. Co.) .... dis 40 %
Belt, (new list Dec. 24, 1879.) .... dis 60&10 %
Bench—Hotchkiss', $5.00 ⅌ doz .... net
" Weston's, No. 1, $10.00; No. 2, $9.00 ⅌ doz dis 25 %
" McGill's, $3.00 ⅌ doz .... dis 10 %
" Skinner's, $6.25 per doz .... dis 20 %
Clothes Line Sargent's list .... dis 60&10 %
" " Reading list .... dis 33⅓&10 %
Ceiling .. } Sargent's list .... dis 60&10 %
Harness, } Reading list .... dis 20&10 %
Coat and Hat, Sargent's list .... dis 60&10&10 %
" " Reading .... dis 33⅓&10 %
Picture Hooks, Brown's Pat. Solid Brass, $4 per gross .... dis 25 %
Tassel (T. & S. Mfg. Co.) .... dis 40 %
Wrought Staples and Hooks and Staples .... dis 65&10 %
" Staples, Stanley's list .... dis 65&10 %
Wire Screw Hooks and Eyes, new list .... dis 60&10 %
Grass and Bush .... dis 40@45 %
Whiffletree—Patent .... dis 40 %
Hooks and Eyes—Malleable Iron .... dis 60&10 %
" Brass .... dis 60&10 %

Horse Nails.
Nos. 5 6 7 8 9 10
Ausable .... ⅌ ℔ 30c 27c 25c 24c 23c 22c } dis 20 %
" Finished, Polished or Blued ... " 31c 28c 26c 25c 24c 23c }
A C .... 60 50 40 30 27 25 23 22 21 21 20 20c } dis
Nos .... 1 2 3 4 5 6 7 8 9 10 11 12 } 15 %
Nos. 5 6 7 8 9 10
H. P. Pointed and Finished .... 26 23 21 20 19 18 } dis 20 %
National, Pointed and Polished, Pat. Fin ..... 28 25 23 22 21 20c %

Horse Shoes.—Burden .... ⅌ keg $4.37½
R. I. Horse Shoe Co., Perkins' Improved Light, Medium and Heavy .... ⅌ keg 4.37½
Mule Shoes .... ⅌ keg 5.37½

Ice Awls, Chisels, &c.
American Ice Chisel .... ⅌ doz. $5.50 net
National " .... ⅌ doz $5.25 dis 20 %
Novelty Ice Breakers .... ⅌ doz $6.25 dis 20 %
White's Sliding Head Picks .... ⅌ doz $2.50 dis 40 %
Dunlap's Ring Picks .... ⅌ doz [illegible] dis 40&10 %
Wood Head Picks, Sargent's ⅌ doz $1.85, dis 60&10&10 %
Iron " ⅌ doz 1.85, dis 60&10&10 %
Ice Mallets Pick in Head .... ⅌ doz 1.75 net
Pick in Handle .... ⅌ doz 3.00 net
Ice Axes, Small, Cast or Malleable .... ⅌ doz 1.20 net
Kitchen Ice Tongs .... ⅌ doz 2.25 net
Combination Ice Tools .... ⅌ doz $200 net

Kettles.
Brass, 7 to 13 inches inclusive .... ⅌ ℔ 35c net
Brass larger than 13 inches .... ⅌ ℔ 38c net
Enameled .... dis 50 %

Knives.
Ames' Butcher Knives .... dis 20 %
" Shoe .... dis 15 %
" Bread .... ⅌ doz $1.50, dis 15 %
Moran's Shoe and Bread Knives .... dis 20 %
Hay and Straw—Wadsworth's .... dis 33⅓ %
Table and Pocket .... See Cutlery

Knobs.
Carriage (Jap'd 80c. ⅌ gross) .... dis 55 %
Base—Common .... dis 30&10%
Hemacite Door Knobs .... New list, dis 35&5 %
Door, Mineral / " Por Jap'd / " " Plated / " " Por .... } Same discounts as Door Locks.
Furniture, Plain .... 75c gross inch, dis 10 %
" Wood Screws .... dis [illegible]
Picture (T. & S. Mfg. Co.) .... dis 5 &10 %
" Sargent's .... dis 60&10 %
Hemacite Picture .... dis 35 %
Shutter, Porcelain .... dis 60&10 %

Ladles.
Melting—Sargent's .... dis 50&10 %
" Reading .... dis 20&10 %
" Monroe's Patent .... ⅌ doz $4.00, dis 40 %

Lanterns
Tubular .... No. 0, $8.65; No. 1, $10.15 } With Guards 35c extra. } net
Hurricane No. 2 .... ⅌ doz $5.75, net
Peerless .... No 5, ⅌ doz $11.75, dis 10&10 %
Brady's Patent .... dis 10&10 %
Ætna .... dis 10&10 %
Yankee .... dis 10&10 %
De Beque .... dis 10&10 %
Police .... Small, $7.00; Med., $8.25; Large, $12.00, dis 10 %
Convex Reflector .... $2.75 ⅌ doz, dis 10 %

Lemon Squeezers.
Porcelain Lined .... ⅌ doz $6.00—dis 30 %
Wood .... ⅌ doz 3.00—dis 30 %
Eureka, Tinned .... ⅌ doz $8.00, dis 10 %
Dunlap's Improved .... ⅌ doz $4.00 net
Sammis' .... No. 1, $7.00; No. 2, $12.00 ⅌ doz., dis 45 %
Townsend's Patent .... $6.00 ⅌ doz., dis 33⅓ %

Lines.—Linen Fish .... dis 25&10 %
Cotton Chalk .... dis 55 %
Sil. Lake Chalk .... Nos. 0, 1, 2, 3, $6.00, $6.50, $7.00, $7.50 .... dis 25 %
Mason's Linen .... dis 25&10 %
Wire Clothes, Galvanized .... each 30 @ 40c net

Locks and Latches.
Cabinet—Eagle .... } Changes made in list price of
" Gaylord .... } some numbers July 1, 1880,
" Bridgeport .. } and also July 15, dis 10&2½
" A. E. Deitz .... dis 40 %
Trunk .... dis 10 %
Langstroth & Crane's List Jan. 1 '77.
Round Key, No. 1 to 5 .... dis 40&10 %
" No. 1½ to 12 .... dis 40& 10 %
Flat Key .... dis 33⅓&10 %
A. E. Deitz, Flat Key .... dis 33⅓
Yale Lock Co., Flat Key .... dis 40 %
"Shepardson" or "U. S." .... dis 35 %
"Felter" or "American" .... dis 33⅓ %
Plate .... dis 33⅓&2 %
F. Many's "Extension Cylinder" .... $10.50 ⅌ doz, net

DOOR LOCKS, &C
Branford / Norwalk / Norwich / P. & F. Corbin / Russell & Erwin / Mallory, Wheeler & Co. / Reading Hardware Co. / Trenton Lock Co. .... } New list June 10, 1880. dis 50&2 % cash
Padlocks—Russell & Erwin .... }
" Mallory, Wheeler & Co .... } .... dis 40 %
" Wm. Wilcox & Co .... } and 2 % for cash
" Yale Lock Mfg. Co.'s "Standard" ... dis 40 %
" Romer's .... dis 30 %
" Conestoga .... dis 60 %
" J. H. McWilliams .... dis 10 %
" A. E. Dietz .... dis 35 %

Mallets.—Hickory .... dis 10&10
" Lignumvitæ .... dis 20 %
Penfield Block Works, Lig., Apple & Hickory .. dis 30 %

Meat Cutters.
Dixon's (P. S. & W.) Nos. 1 3 4
⅌ doz .. $14.00 17.00 19.00 30.00—dis 30 %
Miles' Challenge .... Nos. 1 2 3
⅌ doz .. $22.00 30.00 40.00—dis 30 %
Perry's Nos. 1 2 3 4 4 g'rd 5 g'rd
Each .... $3.00 4.00 5.00 11.00 13.00 36.00—dis 30 %
Woodruff's (P. S. & W.) .... Nos. 100 150
⅌ doz $15.00 18.00 dis 30 %
Hales' .... Nos. 11 12 13
⅌ doz .. $27.00 33.00 45.00 .. dis 40&10&2 %
Draw Cut .... Nos 5 2 6 8 10
Each .. $50.00 75.00 80.00 225.00 400.00—dis 20 %
American .... dis 25 %
Nos .... 1 2 3 4 B 5
Each $5.00 7.00 10.00 25.00 50.00 60.00
Kieser's No. 55 .... $40 per doz., dis 40 %
" Gem .... $25 per doz, dis 40 %
Silver & Deming .... dis 25 %
Pennsylvania .... dis 50 %
Nos 1 2 3 00
⅌ doz $21.00 28.00 36.00 28.00
Beef Shavers (Enterprise Mfg. Co.) .... dis 25 %

Mincing Knives.
Am., (2d quality) per gross, 1 blade, $7; 2 blades, $12; 3 blades, $18 .... net
Lathrop's .... dis 15&10 %
Smith's .... per doz $1.75, dis 10 %
Cowles Hdw. Co .... dis 40&10 %

Molasses Gates.
Stebbins Pattern .... dis 50&10 %
" Genuine .... dis 47½&10 %
" Tinned Ends .... dis 40&10 %
Chase's Hard Metal .... dis 50&10 %
Bush's .... dis 20 %
Lincoln's Pattern .... dis 50&10 %
Weed's .... dis 15 %
Boss, No. 1 2 3 4
$7.00 $8.00 $9.00 $10.00 per doz.
" Japanned Finish .... dis 50&10 %
" Bronze .... dis 45&10 %

Nails .... See Trade Report

Nuts and Washers.
Square Nuts .... 7c off list
Hexagon Nuts .... 7c off list
Washers .... 6½c off list

Nut Crackers
Table (Humason & Beckley Mfg. Co.) .... dis 33⅓ %
Blake's Pattern .... ⅌ doz $3.00, dis 10 %
Turner & Seymour Mfg. Co .... dis 50 %

Oakum.
Best .... ⅌ ℔ 11c
U. S. Navy .... ⅌ ℔ 10c
Navy .... ⅌ ℔ 8½c

Oilers.—Zinc and Tin .... dis 45 %
Brass and Copper .... dis 30&10 %
Malleable (Hammer's) .... ⅌ doz $5.00, dis 10 %
Prior's Patent or "Paragon Zinc .... dis 35 %
" " Brass .... dis 30&10 %
Olmstead's, Tin and Zinc .... dis 40 %
" Brass and Copper .... dis 30 %
Broughton's, Zinc .... dis 40 %
" Brass .... dis 30 %

Ox Balls .... dis 40&10%

Pencils.
Faber's Carpenters' .... High list, dis 40&10 %
" Round Gilt .... ⅌ gross $5.25 net
Dixon's Lead .... ⅌ gross 4.50 net
" Lumber .... ⅌ gross 6.75 net
Dixon's Carpenters' .... dis 40 & 10 %

Packing, Steam.
N. Y. Belting and Packing Co .... new list net

Picture Nails.
Brass Head, Sargent's List .... dis 50&10 %
" T. & S. Mfg. Co .... dis 40 %
Porcelain Head, Sargent's List .... dis 50&10 %
" " Judd's List .... dis 30 %
Porcelain Head, T. & S. Mfg. Co .... dis 33⅓ %
Niles' Patent .... dis 40 %

Pinking Irons .... ⅌ doz 75c, net

Plaiting Machines.
Magic .... ⅌ doz $10.00, net
Astor Plaiting Machine .... each $15.00, dis 20 %
Crown Plaiting Machines .... dis 25 %
6in., $6.00, 10in., $10.00 each

Planes and Plane Irons.
Bench, First Quality .... dis 25&7½ %
" Second " .... dis 30&7½ %
Moulding .... dis 25 %
Bailey's (Stanley R. & L. Co.) new list Jan. '79 dis 20&10 %
The Stanley (S. R. & L. Co.) " " dis 20&10 %
Bailey's "Victor" .... dis 20&10 %
Defiance Adjustable .... dis 20&10 %
Plane Irons, Butcher's .... $5.50 to £
" Buck Bros .... $5.00 to £
" Auburn Tool Co.'s .... dis 5&10 %
" The Globe Mfg. Co. "Baldwin Iron" .... dis 5&10 %
" Ohio Tool Co .... dis 5&10 %
" Sandusky Tool Co .... dis 5&10 %

Pliers and Nippers.
Button's Patent .... dis 33⅓ %
Hall's Pat. Compound Lever Cutting Nippers No. 3; 5 in., $20; No. 4, 7 in., $30 ⅌ doz .... dis 40 %
Humason & Beckley Mfg. Co .... dis 33⅓ %
Gas Pliers .... dis 50 %
Eureka Pliers and Nippers .... dis 25 %
Russell's Parallel .... dis 25 %
P. S. & W. Cast Steel .... dis 35 %
" Tinners' Cutting Nippers .... dis 15 %

Plumbs and Levels.
Disston's .... dis 70 %
Stanley R. & L. Co.'s Pat. Adjustable .... dis 20&10 %
" " " Non-Adjustable .... dis 20&10 %
Chapin's Patent Adjustable .... dis 60&10&
" Non-Adjustable .... dis 60&10 %
Standard Rule Co.'s New Adjustable .... dis 60&10 %
" Non-Adjustable .... dis 60&10 %
Johnson's Patent Adjustable .... dis 60&10 %
Pocket Levels .... dis 60&10 %
Davis' Inclinometers .... dis 20 %

Post Hole and Tree Augers.
Samson Post Hole Digger .... per doz $37.50, dis 20 %
Fletcher Post Hole Augers .... ⅌ doz 36.00, dis 20 %
Vaughan's Post Hole—
6 in. $22.50; 7, 8 and 9 in. $25 per doz .... dis 15&10 %
Eureka Diggers ⅌ doz. $40.00 .... dis 25&10 %

Pruning Hooks and Shears.
Disston's Combined Pruning Hook and Saw per doz $19.00, dis 20 %
" Pruning Hook .... " 12.50, dis 20 %
E. S. Lee & Co.'s Pruner .... dis 30 %
Pruning Shears .... ⅌ doz $5.50@$8.00

Pulleys.
Hot House and Tackle .... dis 60&10 %
Jap'd Screw .... dis 60&10 %
Brass Screw .... dis 60&10 %
Jap'd Side .... dis 60&10 %
" Clothes Line .... dis 60&10 %
Hay Fork Solid Eye, $4.50; Swivel, $5.00, dis 30&10&10 %
" " "Anti-Friction," .... $7.50 dis 20&10 %
" " "F" Common and Pat. Bushed .... dis 20 %
" " Tarbox Pat. Iron .... dis 20 %
Shade Rack .... dis 50 %

Punches.
Belt or Drive .... ⅌ doz $2.00; 2.25; 2.50, dis 45 %
Bemis & Call Co.'s Cast Steel Drive .... dis 50&5 %
" " Springfield Socket .... dis 50&5 %
Spring .... ⅌ doz $7.00, dis 45 %
Leach's Patent .... dis 15%
Bemis & Call Co.'s Spring and Check .... dis 40 %
Solid, Tinners' .... ⅌ doz $1.40, dis 40 %

Rail.
Sliding Door Wrought Brass.....₩ ℔ 42c dis 20 %
" " Iron, Painted . ₩ foot 10c.dis 60&10 %
Barn Door....Inch..... ⅜ ½ ⅝
Per 100 feet. $2.00 3.60 5.60—dis 10 %
" for N. E. Hangers—
Small. Med. Large.
Per 100 feet. .. ..$2.10 2.70 3.30—net

Razors.
J. R. Torrey Razor Co.....dis 10 @ 20 %

Razor Straps.
Genuine Emerson.....dis 40@50 %
Badger's Emerson.....dis 40
Badger's (not Emerson).....dis 25 %
Evans'.....dis 40 %
Imitation Emerson.....₩ doz $2.75, dis 40&10 %
Hunt's. .....dis 40&5 %
Chapman. .....dis 15@20 %
Saunder's.....dis 10 %
Torrey's .....dis 20 %

Rivets.
Iron and Tinned.....dis 40 %
In bulk, list of May 21.....dis 20 %
Copper Rivets and Burs.....dis 35
Nos.. 7 8 9 10 11 12 13 14 15
₩ ℔ .40c 40c 42c 44c 46c 58c 60c 64c 70c
Tinned Iron Belt Rivets and Burs.....dis 20
Rivet Sets.....dis 20&10

Rods.
Stair.....New , March 1 '79, 10
" American Patent..... .. dis 20 %

Rollers.
Barn Door, Sargent's list.....dis 55&10 %
Novelty.....dis 10 %
Acme (Anti-Friction).....dis 50 %

Rope. Manufacturers' Net List, Sept. 20, 1880
Manila .....½ inch and larger ₩ ℔ 13 c
" .....⅜ inch ₩ ℔ 13½c
" .....¼ and 7-16 inch ₩ ℔ 14 c
" Tar'd Rope.....₩ ℔ 12½c
" Lath Yarn.....₩ ℔ 12½c
" Hay Rope.....₩ ℔ 13 c
Bisal.....½ inch and larger ₩ ℔ 10½c
" .....⅜ inch ₩ ℔ 11 c
" .....¼ and 7-16 inch ₩ ℔ 11½c
" Hay Rope.....₩ ℔ 10½c

Rules.
Boxwood. Ivory
Chapin's.. .... .. } dis 6 &10 % } dis 50&10 %
Standard.... .....
Stanley.....
Stephens.....

Sad Irons.
From 1 to 10 lbs.....₩ ℔ 37½c net
Self Heating.....₩ doz $6.50 net
" Tailors'.....₩ doz $18.00 net
Gleason's Shield and Toilet.....dis 25 %
Enterprise Patent Cold Handle.....dis 30 %
Mrs. Pott's Pat. Cold Handle, "Crown".....dis 30 %
Combined Fluter and Sad Iron..per doz $16.00, dis 15 %

Sand Paper.
Baeder & Adamson's Flint, 00 to 1½..$4.75 ₩ ream | dis
" " " 2, 2½ & 3. 4.25 ₩ ream | 20@
" " " Assorted 4.75 ₩ ream | 25 %
" " Star..... 3.75 ₩ ream |
" " Emery..₩ ream $6.50 @ 11.50)
New England, same list as B. & A. Flint.....dis 20@25 %
Gaze's.....dis 20&5 %

Sash Cord.
Common.....₩ ℔ 14 @ 20c net
Patent.....₩ ℔ 19c net
Silver Lake Russia Flax.....₩ ℔ 6 c. dis 10 %
" White Cotton.....₩ ℔ 60c. dis 10 %
" Drab Cotton.....₩ ℔ 65c. dis 10 %
Raw Hide.....dis 20 %
Steel Ribbon.....dis 10 %

Sash Locks.
Clark's, No. 1, $10.00; No. 2, $8.00 per gross.....dis 33⅓%
Ferguson's.....dis 33⅓ %
Walker's.....net
Hammond's Window Springs.....$9.00 per gross, dis 10 %
Northup Window Springs.....$9.00 per gross, dis 10 %
The Perfect, Clark & Smith, Plain Jap'd ₩ gro $10.00 net
" " Por.Knob Jap'd. ₩ gro 14.00 net
" " Nickel-Plated...₩ gro 27.00 ne

Sash Weights.—Solid Eyes, in 500 ℔ lots and over.....₩ ℔ 1¾c net

Sausage Stuffers or Fillers.
Miles.....₩ doz $20, dis 30 %
Perry.....₩ doz, No. 1½ No. 0, $21, dis 30 %
Fraw Cut No. 4.....each $30.00, dis 20 %
Enterprise Mfg. Co.....dis 20 %
Silver's.....dis 25%

Saws.
Disston's Circular.....dis 35 %
" Mill.....dis 35 %
" Cross Cut.....dis 25 %
" Hand, Panel, Rip, &c.....dis 20 %
Boynton's Lightning, Cross Cuts, new list.....dis 20 %
" One-Man, all lengths, " .....dis 20 %
" Billet Webs, 30 in. " .....dis 25 %
" Lightning Buck Saws X Par.....dis 25 %
" Lightning Hand, Panel and Rip.....dis 25 %
Wheeler & Clemson Mfg. Co.'s Hand.....dis 20 %
W. M. & C. Mfg. Co. Cross-Cuts, except Monarch, dis 20 %
Livingston's Butcher and Kitchen.....dis 20 %
Framed Wood—
Nos.... 101 102 103 104 105
Per doz..$10.00 5.40 10.00 7.40 5.2c net

Saw Frames.
White, Vermont.....₩ doz $1.35, dis 25 %
Red, Polished and Varnished.....₩ doz $2.00, dis 25 %
Saw Rods.....$10 list dis, 10&10 %

Saw Sets.
Boynton's Patent X Cut, per doz. $12.00; Hand Saw, per doz., $10.00;.....dis 20 %
Stillman's Genuine.....₩ doz $4.00@$5.00 dis 1 %
" Imitation.....₩ doz $2.25, dis 20&10 %
Common Lever.....per doz $2.00. dis 20&10 %
Leach's.....No. 0, $2.00; No. 1, $10.00, dis 15 %
Nash's.....No. 1, $2.40; No. 2, $3.40, dis 20&10 %
Hammer, Hotchkiss.....$1.40. dis 10 %
" Remis & Call Co.'s New Pat.....dis 40&2c
Remis & Call Co.'s Lever & Spring Hammer..dis 30&5 %
" " Plate.....dis 10 %
" " Cross Cut.....dis 12½ %
Aiken's Genuine.....$13.00. dis 5&10 %
" Imitation.....$7 00. dis 10 %
Hart's Patent Lever.....dis 20 %
Disston's.....dis 20 %

Scales.
Hatch, Counter, No. 171.....₩ doz $36. dis 35&10 %
" Tea, No. 181.....₩ doz $16.00 dis 40&10 %
Union Platform.....$6 00. dis 45 %
Fairbanks'.....dis 20 %
Buffalo Scale Co.....dis 20&5 %
Howe's.....dis 20&5 %
Chatillon's Grocers'.....dis 42 %
" Eureka.....dis 25 %
Family Universal.....dis 50 %
" Favorite .....dis 30 %
" Turnbull's.....dis 30 %
Scale Beams, Chatillon's list.....dis 10 %
" Sargent's list.....dis 40&10 %

Scrapers.
Adjustable Box Scraper (S. B. & L. Co.), $6.40.dis 20&10 %
Box, 1 Handle.....₩ doz $5.00, dis 10 %
" 2 " .....₩ doz 6.00 dis 10 %
Defiance Box and Ship.....dis 20&10 %
Foot.....dis 70&10 %
Ship (common).....per doz $3.00 net
" (Providence Tool Co.....dis 10 %

Screw Drivers.
Douglass Mfg. Co.....dis 20&10&10 %
Disston's.....dis 50 %
Disston's Patent Excelsior.....dis 50 %
Buck Bros .....dis 25 %
Stanley Rule & Level Cos., Varnished Hdls..dis 50&10 %
" " Black Hand'ps...dis 40&10 %
Sargent & Co.'s.....dis 50&10 %
Gay's Double Action Ratchet
per doz., 4 in., $2.00; 5 in., $10.20; 6in., $12.00 dis 30 %
Cowles Hdw. Co., No. 1 Extra.....dis 40&10 %
" " No. 2.....dis 50&10 %
" " Nos. 4 and co.....dis 30 %

Screws.
Flat H'd Iron.....dis 25 %
Round Head Iron.....dis 40 %
Flat Head Brass.....dis 45 %
Round Head Brass.....dis 35 %
brass and Silver Capped.....dis 40 %
Japanned, list of Plain Screws.....dis 30&10 %
Coach Patent Gimlet Point, List per 100.....dis 40&55 %
Bed.....dis 40&10 %
Machine, Flat Head, Iron, Am. Screw Co.....dis 60 %
" Round Head, Iron, " .....dis 55 %
Bench, Iron.....dis 55 %
" Wood, Beech .....₩ doz $3.00, dis 15 %
" " Hickory.....dis 20&10 %
Hand.....dis 25&10 %
Hand Rail, Sargent's.....dis 50&10&10 %
" " Humason, Beckley & Co's .....dis 40 %
" " Am. Screw Co.....dis 35 %
Jack (Wilson's).....dis 20 %

Screw Window Balances.
R. B. Huguenin's.....$36.00 per gross, dis 25 2 10&5 %

Scroll Saws.
Lester, $10.0 .....dis 20 %
Rogers, $3.40.....dis 20 %

Shears and Scissors.
American (Cast) Iron.....dis 60&10&5
Clipper Cast Iron.....dis 70&10
Pruning.....see Pruning Hooks and Shears.
Barnard's Lamp Trimmers.....₩ doz $3.75
Tinners'.....dis 15 %
Seymour's, List, Nov. 25, 1879.....dis 60 %
Heinsch's .....dis 60 %
" Tailors' Shears.....dis 33⅓ %
Mass. Cutlery Co. St. Trimmers.....dis 75 %

Sheaves.
Sliding Door, M. W. & Co., list.....dis 50&2 %
" R. & E. list.....dis 60&1 &2 %
" Patent Roller.....dis 10 %
" " " Hatfield's ...dis 60&10 &2 %
" Russell's Anti-Friction ...dis 60&10 &2 %
" Moore's Anti-Friction.....dis 40 %
Sliding Shutter, R. & E. list.....dis 60&10 &2 %
" " Sargent's list.....dis 55&10 %
Moore's Anti-Friction (Hanging).....dis 40 %

Shovels and Spades.
Ames. New list, Jan. 26, 1880.....dis 10 %
Hussey Binns & Co., Patent.....dis 15 %
" " Association List.....dis 5 %
Old Colony (changes in list Oct. 15, '79).....dis 15 %
Remington's (Lowman's Patent).....dis 25 %
Rowland's.....dis 40 &
Griffiths.....dis 40&10 %

Shovels and Tongs.
Iron and Brass Head, R. & E. list.....dis 40&10&2 %
Polished Steel .. ..new list. dis 40&10&2 %

Slates.
Square Frames.....by case.....dis 70 %
Less than a case.....dis 65&10 %

Spoke Shaves.
Defiance Metallic.....dis 20&10 %
Iron.....dis 40 %
Wood.....dis 30 %
Bailey's (Stanley R & L. Co.) new list..... dis 20&10%

Spoke Trimmers.
Bonney's.....₩ doz $10.00 dis 40&5 %
Stearn's.....₩ doz $10.00, dis 40 %
Ives'.....No. 1, $15.00; No. 2, $12.00 ₩ doz, dis 40&10 %
Douglass'..... ...₩ doz $9.00, dis 15 %

Spoons.
Pat. Thread Basting..... ..dis 30&10 %
" Riveted Table and Tea.....dis 15@50 %
Solid Table and Tea.....dis 50 %
Britannia..... ....dis 55 %
The Wm. Rogers Mfg. Co..... .....dis 33⅓&2 %
Reed & Barton.....dis 33⅓&2 %
Hall & Elton.....dis 33⅓&2 %
Holmes, Booth & Haydens.....dis 33⅓&2 %
German Silver.....dis 25&10 %
Cast Steel, Sil. Plated.....dis 33⅓ %
Tin (P. S. & W.), Teas.....$1.25 ₩ gross, net
" " Tables.....$2.00 ₩ gross, net
Tin Cowles Hdw. Co.).....dis 10 %
" " " case lots.....dis 20 %

Stocks and Dies.....dis 5&10 %
'Lightning" Screw Plate.....dis. 10 %

Stone.
Hindostan Hacker Stone.....₩ gross $12.00 dis 10 %
Sand Stone.....₩ ℔ 6c. dis 33⅓&10 %
Washita Stone.....No 1. ₩ ℔ 18c net
" .....No 2. ₩ ℔ 14c net
" Slips.....No. 1, ₩ ℔ 26c net
Washita Stone (Boyd & Chase).....No. 1 ₩ ℔ 15c net
" " Slips (Boyd & Chase).....30c net
" " mo'tea (Boyd & Chase) 6, 7 & 8 in, dis 30 %
" " No. 2..... ₩ ℔. 13c. net
Arkansas Stone No. 1, 4 to 6 in.....₩ ℔ $1.35 net.
" No 1, 6 to 9 in .....₩ ℔ $2.00 net
Turkey Oil Stone (Boyd & Chase)....4 to 8in, $1.00 ₩ ℔, dis 10 %
" Slips .....$2.50 ₩ ℔, dis 20 %
Lake Superior (Boyd & Chase).....₩ ℔ 20c, dis 10&5 %
" " Slips " .....₩ ℔ 45c, dis 10&5 %
Grindstones. Family, Loring's.....dis 10 %

Stove Polish.
Joseph Dixon's.....₩ gross $5.75 net
Gem.....₩ gross $4.50, dis 10 %
Gold Medal.....₩ gross $6.00, dis 25 %
"Mirror".....₩ gross $6.00, dis 15 %
Ruby.....₩ gross $3.75, net
Rising Sun.....₩ gross $4.75, net
Dixon's Plumbago.....₩ ℔ 8c. net

Squares.
Steel.....dis 40 %; full cases, dis 50&10 %
Iron.....dis 40 %; full cases, dis 50&10 %
Nickel Plated.....add $2.50 @ $4.00 ₩ doz, net
Try Squares and T Bevels.....dis 45&10 %
Disston's Try Squares and T Bevels. .....dis 25&5 %
Winterbottom's Try and Mitre..... ....dis 20&10 %

Tacks, Brads, &c.
List of April 2, 1880
Tinned Swedes Tacks.....dis 35 %
Tinned American " .....dis 45 %
Swedes Tacks, all kinds.....dis 20 %
Copper Tacks and Nails.....dis 25 %
Swedes Hungarian Nails .....dis 20 %
American " .....dis 20 %
Gimp and Lace Tacks.....dis 50 %
Finishing Nails.....dis 15 %
Trunk and Clout Nails.....dis 15 %
Common and Patent Brads.....dis 10 %
Basket Nails .....dis 15 %
Brush Tacks. .....dis 10 %
Leathered Carpet Tacks.....dis 20 %
American Cut Tacks.....dis 20 %
Cigar Box Nails.....dis 20 %
Chair Nails.....dis 20 %
All other Tacks List goods.....dis 20 %
Double-Pointed Tacks .....dis 40&5 %
Extra 10 % on all.

Tap Borers.
Common and Ring.....dis 15 %
Ives' Tap Borers.....dis 15&10 %
Enterprise Mfg. Co.....dis 20 %

Tapes, Measuring.
American.....dis 20 %
Spring Tapes.....dis 25&10 %

Thermometers.
Tin Case .....dis 70 %

Tobacco Cutters.
Enterprise Mfg. Co. (Champion).....dis 20 %
Wood Bottom.....₩ doz $12.00, dis 33⅓ %
All Iron.....₩ doz $10.50, dis 40 %
Nashua Lock Co.'s.....₩ doz $18.00, dis 50 %

Toe Calks.—Winsted.....₩ ℔ 9c. dis 5

Tinners' Tools and Machines.
Machines (P. I. & W.).....list add 20 %
Tools (P. S. & W.)..... add 6 %

Transom Lifters.
Wollensak's Patent.....dis 20 %

Traps.
Game Newhouse.....dis 30 %
" Newhouse Pattern.....dis 50 %
" Blake's Patent.....dis 40 %
Mouse, Wood, Choker.....₩ doz holes, 16½c
" Round Wire.....₩ doz $1.50, dis 10 %
" Cage " .....₩ doz $2.50, dis 10 %
" Catch-em-alive.....₩ doz $2.50, dis 10 %
Rat. "Decoy".....per doz $10.00, dis 10 %

Trowels.
Lothrops Brick and Plastering.....dis 20 %
Reed's Brick and Plastering.....dis 15 %
Disston's Brick and Plastering.....dis 20 %
Peace's Plastering.....dis 30 %
Clement & Maynard's.....dis 10@15 %
Rose's Brick.....dis 15 %
Brades' Brick.....dis 20 %
Worrall's Brick and Plastering.....dis 20 %
Garden.....dis 45 %

Triers.
Butter and Cheese.....dis 25%

Vises.
Solid Box.....List of July 1, '79 dis 25 %
" "Crown" (A. H. Hildick) 40 to 100 ℔, 15c net
" Peter Wrights.....15½c
Parallel, Parker's.....dis 10 %
" Wilson's.....dis 40 %
" Howard's.....dis 20&10 %
" Merrill's.....dis 15 %
" Sargent's.....dis 50&10 %
" Trenton.....dis 20 %
" Backus and Union.....dis 40 %
" Oval Slide.....dis 40 %
" Fisher & Norris.....dis 15&10 %
" Prentiss.....dis 25 %
" Stevens'.....dis 20 %
" Simpson's Adjustable.....dis 25 %
"Family" Lists.....net
Saw Filers, Bonney's.....₩ doz $24.00, dis 20&10 %
" Stearn's.....dis 20&10 %
" Hopkins'.....₩ doz $17.50 dis 10 %
Lowell Hand Vises.....dis 20 %
Richardson's Vise and Anvil.....dis 25 %

Washer Cutters.
Smith's Patent .....₩ doz $12.00 dis 25 %
Johnson's.....₩ doz $12.00. dis 33⅓ %
Penny's.....₩ doz $14.00 and $16.00. dis 45 %
Appleton's.....₩ doz $8.00, dis 20&10 %

Washers.—See Nuts and Washers.

Well Wheels.—Revised list.....dis 60&10%

Wire.
Brass and Copper..... List of June 10, 1880....dis 20 %
Bright and Annealed..... Nos. 0 @ 18. dis45 @ 50 %
" " ....Nos. 19 @ 26, dis 52½ @ 57½ %
....Nos. 27 @ 36.dis 60 @ 65 %
Coppered.....Nos. 0 @ 18.dis 40 @ 45 %
Galvanized, Nos. 0 to 6.....₩ ℔ 10c. dis 35 @ 37½ %
" Nos. 7 to 18.....market list. dis 35 @ 37½ %
Tinned. Nos. 0 to 18.....dis 37½ @ 42½ %
Cast Steel.....dis 25 @ 30 %
Tinned Broom Wire, Nos. 18 to 24.....dis 47½ @ 50 %
Annealed Fence, 7 0s, 8 and 9 .....dis 40 @ 50 %
" Grape, Nos. 10 to 14. ..... dis 45 @47½ %
Galvanized Telegraph, Nos. 7 to 9 .....₩ ℔ 9c
" " Nos. 10 and 11.....₩ ℔ 10c
No. 12 .....₩ ℔ 10½ c
Fence Staples.....₩ ℔ 7¼@ 7½c
" Staples, Galvanized.....₩ ℔ 8¼ @ 8½c
Stubs Steel Wire.....$7.00 to £
Japanned Barb Fence .....₩ ℔ 9c
Galvanized " .....₩ ℔ 10c
Steel Music Wire, Nos. 12 to 27.....₩ ℔ $1.25 net
Turner & Seymour Mfg. Co., Picture Wire..dis 80&20 %
Judd's Picture Wire.....dis 80&20 %
Clothes Line Wire, Galvanized.....₩ coil 32@40c net
Wire Cloth, greenand drab.....₩ sq. ft, 3½ c net

Wrenches.
American Adjustable.....dis 45 %
Baxter's Adjustable "S," .....list Jan., 1880. dis 25 %
" Diagonal.....dis 25 %
Coes 'Genuine.....dis 5 %
" "Mechanics".....dis 60&10 %
" Pattern, Malleable.....dis 70 %
Girard Standard.....dis 50&10 %
Girard Agt .....60&10 %
Bemis & Call's Patent Combination.....dis 20 %
" " Merrick's Pattern.....dis 35 %
" " Briggs' Pattern.....dis 25 %
" Cylinder or Gas Pipe.....dis 40 %
Van Wagoner & Williams' Basin .....per doz $4.50
Aiken Pocket (Bright).....$6.00. dis 60&10 %
The Favorite Pocket (bright).....per doz $3, dis 60 %
Webster's Pat. Combination.....dis 33 %

Wringers. Per doz.
Universal, XX No. 2¼.....$30.00
" " No. 2 .....23.00
" " No. 1½ 21.00
" " No. 1.....25.00
" " No. 0.....EACH. 12.00
" " No. 12.....20.00
" " No. 18.....25.00
" " No. 22.....32.00
Peerless, No. 0, no Cogs.....51.00
" No. 1, " 54.00
" No. 2½, with Cogs.....60.00
" No. 2, " 65.00
" No. 3, " 71.00
" No. 4, " 96.00
Unique, No. 0.....51.00
" No. 1.....54.00
Eureka, No. 1.....54.00
Novelty, No. 10, with Cog Wheels.....60.00
" No. 2, " 65.00
Excelsior, No. A, with Folding Bench.....75.00
" No. E, for Set Tubs.....65.00

NEW YORK WHOLESALE PRICES, October 27, 1880.

METALS.

IRON.—DUTY: Bars, 1 to 1½c. ₩ lb; Sheet, Band Hoop and Scroll, 1¼ to 1¾c. ₩ lb; provided, that none of the above Iron shall pay a less rate of duty than 35 per cent. Pig, $7 ₩ ton; Polished Sheet, 3c. ₩ lb; Wrought Scrap, $8 ₩ ton; Cast Scrap, $6 per ton. Railroad, 70c. ₩ 100 lbs. Boiler and Plate, 1¼c. ₩ lb.

Iron—AMERICAN		
Foundry No. 1	₩ ton	$25.00 @ 26.00
" No. 2X	₩ ton	20.00
Gray Forge	₩ ton	19.00 @ 19.50
SCOTCH.		
Eglinton	₩ ton	21.50
Coltness	₩ ton	23.50
Glengarnock	₩ ton	23.00
Gartsherrie	₩ ton	22.50 @ 23.00
Rails.		
Iron	₩ ton	$26.00 @ 48.00
Steel	₩ ton	50.00 @ 53.00
Old Rails	₩ ton	24.50 @ 26.50
Scrap.		
Wrought Scrap	₩ ton	25.00 @ 26.00

Bar Iron, from Store.—

Common Iron:		
¾ to 2 in. round and square / 1 to 6 in. x ¾ to 1 in	₩ lb	2.4c
Refined Iron		
¾ to 2 in. round and square / 1 to 6 in. x ¾ to 1 in / 1 to 6 in. x ¼ and 5-16	₩ lb	2.6c
Rods—¾ and 11-16 round and square	₩ lb	2.8c
Bands—1 to 6 x 5-16 to No. 12	₩ lb	3.3c
Norway Nail Rods		7. c

Sheet Iron.

	Common American	R. G. American
Nos. 10 to 20	₩ lb 3¾	5
" 21 to 24	₩ lb 4	5
" 25 to 26	₩ lb 4¼c	5¼
" 27	₩ lb 4⅜c	5⅜
" 28	₩ lb 4¾c	5¾
	B.B.	2d qual.
Galvanized, 10 to 20	₩ lb 8c	7c
" 21 to 24	₩ lb 9c	8c
" 25 to 26	₩ lb 9½c	8½c
" 27	₩ lb 10¼c	9c
" 28	₩ lb 11c	9½c

Patent Planished ₩ lb 12c; B, 10½c
Russia 12@13 c
American Cold Rolled ₩ lb 5 @7½c

COPPER.—DUTY: Pig, Bar and Ingot 1, 2c; Old Copper 4c lb; ₩ Manufactured (including all article of which Copper is a component of chief value), 45 ₩ ad valorem.

American Ingot ₩ lb See Trade Report.

SHEATHING, BRAZIERS' COPPER, BOLTS, &c.

Braziers' Copper, ordinary sizes, 16oz. per sq. ft., and over per lb 28c
Braziers' Copper, ordinary sizes, under 16 oz. and over 12 oz., ₩ sq. ft. ₩ lb 30c
Braziers Copper 10 oz and 12 oz., ₩ sq. ft. ₩ lb 32c
" Lighter than 10 oz. ₩ sq. ft. ₩ lb 34c
Circles less than 24 in. in diameter ₩ lb 31c
Circles 24 in. diameter and over ₩ lb 34c
Segment and Pattern Sheets ₩ lb 31c
Locomotive Fire Box Sheets ₩ lb 26c
Sheathing Copper, over 12 oz. ₩ sq. ft. ₩ lb 26c
Bolt Copper ₩ lb 28c
Copper Bottoms ₩ lb 31c

No Copper is Sheathing except 14x48 inches and not to exceed 34 oz. to the sq. ft.

TINNING.

14x48 ₩ sheet 60

All other size Sheets, 2½c. per square foot.
For tinning both sides, double the above amount.

O'REILL'S PATENT PLANISHED COPPER.—Net.

14x48.		
4 and 16 oz. and heavier	₩ lb 36c	By the case, ₩ lb 34c
12 oz. and lighter	₩ lb 39c	" " ₩ lb 38c
Boiler Sizes.		
7 in., 14x52. 8 in., 14x56. 9 in., 14x60.		
14 and 16 oz. and heavier	₩ lb 38c	By the case, ₩ lb 37c
(And all sizes not over 20 in. wide.)		
30x60.		
4 and 16 oz. and heavier	₩ lb 40c	
12 oz.	₩ lb 43c	

Brass.

Brown & Sharp's Gauge the Standard for Metal; Old English Gauge the Standard for Wire.

BRASS MANUFACTURERS' PRICE LIST.—dis 20%.
June 10, 1880.

Cash prices for Roll and Sheet Brass. For less quantity than 100 lbs. add 30 ₩ lb.

HIGH BRASS.

All Nos. not thinner than to No. 28, wider than 2 in., not wider than 14 in. 30c
All Nos. to No. 28, inclusive, and widths over 14 to 20 in., inclusive. 34c
All Nos. to No. 28, inclusive, and widths over 20 to 30 in., inclusive. 38c
¼c ₩ lb advance on each No. above Nos. 28 to 36, inclusive.
All Brass thinner than No. 36 is Platers' Brass, at 43c
Sheets 24x28, and all sheets cut to particular sizes and lengths under 30 in., in width wider than 2 in. 37c
Printers' Rules 45c
Sheets wider than 30 in. and under 40 in. 47c
" 40 in. and over 50c
Circular Sheets, in diam. from 4 in. to 14, inclusive. 30c
" " over 14 " 20 " 45c
" " " 20 " 30 " 49c
" " " 30 " 40 " 52c
" " " 40 in. 59c

LOW BRASS.

4c ₩ lb more than High Brass,
Gilding Metal, 8c ₩ lb more than High Brass.

Platers' or Gold Metal	In Bars	48c
	Sawed	51c
	Planed or Polished	54c

FOR SLITTING.

Metal in width 2 in. to ⅜ in. to No. 28, inclusive, 1c. ₩ lb advance.
Metal, in width 2 in to 1 in., thinner than No. 28, 2c. ₩ lb advance.
Metal, in width 1 in. to ¼ hinner than No. 28, 3c ₩ lb advance
Metal, in width ¼ in. to ¼, inclusive, not thinner than No 28, 2c. ₩ lb advance.
Metal, in width ¼ in. to ¼ thinner than No. 28, 5c. ₩ lb advance.
Metal, ¼ in. in width and less, 10c. ₩ lb advance.
Any of the above widths cut to particular lengths, add 7c. ₩ lb.

GERMAN SILVER MARKET METAL AND WIRE.

	Market Metal.	Wire.
4 per cent., 12 inch, to No. 26	$0.42	$0.70
6 " " "	.66	.76
10 " " "	.64	.88
12 " " "	.74	1.03
13 " " "	.80	1.12

German Silver Sheets over 12in. wide and weighing more than 10 lbs., $2.00 ₩ lb.
Advance 2c. for each additional inch in width above 12 in., and 2c. ₩ lb on each No. thinner than Nos. 26 to 26, inclusive
All German Silver thinner than No. 36 is Platers, at 50c ₩ lb additional.
German Silver Scrap one-half less than net price of 12 in. Market Metal. German Silver Turnings, Fillings and Chips, half the price of Scrap.

BRASS AND COPPER WIRE.

	High Brass.	Low Brass.	Glid'g and Copper.
No. 0 to 20	$0.33	$0.37	$0.15
No. 21	.36	.40	.16
No. 22	.37	.41	.17
No. 23	.38	.42	.18
No. 24	.40	.44	.20
No. 25	.43	.47	.21
No. 26	.45	.49	.23
No. 27	.48	.52	.28
No. 28	.52	.56	.63
No. 29	.55	.59	.66
No. 30	.58	.62	.72
No. 31	.62	.66	.78
No. 32	.66	.70	.84
No. 33	.70	.74	.93
No 34	.74	.78	1.03

Spring Wire 2c ₩ lb advance.
Flat, Square and Half Round Wire 4c ₩ lb advance on Round Wire.
Fancy Wire not less than 100 ₩ lb advance of Round Wire.
Brass Rods, No. 8 and larger, not less than 2 feet lengths, 38c.
Wire straightened and cut, smaller than No. 8, and not less than 2 feet lengths, 43c.
Wire and Rods less than 2 feet lengths, special rates.
Twelve cents per lb extra for spooling on 1 lb spools

MISCELLANEOUS.

Brass Pail Ears	$0.60
Brass Door Rail	.03

SCRAP.—dis. 20 %

High Brass Scrap	12c
Low " "	14c
Gilding "	10c

Turnings, Fillings and Chips half the price of Scrap.
Terms—Net cash. Interest to be added after thirty days.

TUBING.—dis 20 %

	₩ lb
Plain No. 2 inclusive above ¼ in. to 3 in.	$0.45
" above 3 in.	.53

Nos. 21, 22, 23, two cents advance on List for each Number.
Nos. 24, 25, 26, four cents advance on List for each Number.
Above No. 26, special rates.

Plain, ¼ inch	.70
" 9-16 "	1.10
" ¾ "	1.60

All Mandrel Drawn Tubes, 5 cents advance on List Prices.
Fancy Tubing to No 20 50c
English, Scotch and Extra Patterns Fancy Tubing to No. 20 .55
Plain Sawed or Cut 2 to 4 feet long, 2 cents advance on List.
Add to 2 cents ¼ cent for each additional cutting under 2 feet.
Mandrel Drawn Tubes under ¾ in., 25 cents per pound advance.

RING TUBING.—dis 20 %.

Plain	.27
Fancy	.33
Scotch and Extra Patterns	.30

GERMAN SILVER TUBING.—dis 10 %

4 Per cent.	.80
6 "	.90
9 "	1.05
12 "	1.20
15 "	1.35
16 "	1.40
18 "	1.50
20 "	1.60

STEEL.—DUTY: Bars, Ingots, Sheets and Coils valued at 7 cents ₩ lb., or under, 2¼ cents; over, 7 cents, and not above 11, 3 cents ₩ lb; over 11, 3½ cents ₩ lb, and to ¾ ad val. Railway Bars, 1¼ cents ₩ lb. Railway Bars, in part Steel, 1 cent ₩ lb. Provided, that Metal cemented, cast or made from Iron by the Bessemer or pneumatic process, of whatever form or description, shall be classed as

American Cast Steel.

For American Steel see quotations under heading of Pittsburgh.

English Steel.—

Best Cast	₩ lb 15½c
Extra Cast	₩ lb 16½c
Round Machinery, Cast	₩ lb 10c
Swaged, Cast	₩ lb 18c
Best Double Shear	₩ lb 15½c
Blister, 1st quality	₩ lb 13c
German Steel, Best	₩ lb 11c
" 2d quality	₩ lb 10c
" 3d quality	₩ lb 9c
Sheet Cast Steel, 1st quality	₩ lb 15½c
" 2d quality	₩ lb 14½c
" 3d quality	₩ lb 12½c

ANTIMONY See Trade Report

LEAD.—DUTY Pig $2 ₩ 100 lbs; old Lead, 1½c lb ₩ Pipe and Sheet, 2½c ₩ lb.

American	5¼ @ 5½c
Bar	6c net
Pipe	6½c dis 10 %
Tin Lined Pipe	14c. dis 10 %
Sheet	7c. dis 10 %
Shot	Drop 7½c, Buck, 8¼c
Chilled Shot	8½c

BABBITT METAL.

N. P. U.	₩ lb 7½ @ 80
A. 25c; B, 20c; C, 15c.	

TIN.—DUTY: Plates, Sheets, Tagger and Terne, 1.1c ₩ lb; Electro-galvanized Plates, 2c ₩ lb; Manufactures of, not enumerated, 35 per cent. ad. val. Bars, Block and Pigs free. Banca, subject to duty of 10 per cent

Banca	35 @ 26c
Straits	₩ lb 22c
English	₩ lb 21 @ 22c

TIN PLATES.

I C 10x14 / 14x20	Prime Charcoal	$6.50
I C 12x12	"	6.75
I X 10x14 / 14x20	Charcoal	8.50
I X 12x12	"	8.75
D C 12½x17		6.00
D X 12½x17		8.00
For each additional X add		2.00

COKE TIN PLATE.

	Best.	Ordinary.
I C 10x14	$6.00	5.00 @ 5.75
I C 14x20		
I C 12x12	6.25	5.50 @ 5.75

TERNE PLATE

	Prime Char.	2d qual.	Coke.
I C 14x20	$ 5.75	5.50	5.25
I X 14x20	7.75	....	...
I C 20x28	12.00	11.50	11.00
I X 20x28	16.00	....	...
I C 20x30	22.00	....	....
I C 14x20 M. F. Brand			8.00 @ 8.25

SOLDER No. 1, 12c @ 13 c; No 2. 11c

SPELTER—DUTY: in Pigs, Bars and Plates, $1.50 ₩ 100 lbs.

American, cash	5¼ c
Bergen Port from Lehigh Ore	10c
Lehigh, on spot	9c

ZINC.—DUTY: Pig or Block, 1.50 ₩ 100 lbs. Sheet 2½c ₩ lb.

Sheet, Cask	7¼ @ 7¾
" Open	7½ @ 8

Paper Stock, &c.

(Dealer's Selling Price.)

Canvas linen	4 @
White cotton, new	4½ @
" " No. 2	3½@
White linen rags No. 1	5 @
" " No. 2	3½ @
Seconds	2¼ @
Soft woolens	.12 @ 1
Gunny bagging	3⅜ @
Jute Butts	3 @ 3½
Kentucky bagging	4½@
Waste paper and scraps	1 @ 1¾
Rope cuttings	1½ @ 3
Kentucky bale rope	4 @ 4½
Grass rope	3¼ @ 3½
Tarred shaking	1¾ @
Hard White Shavings, No. 1	4½ @ 4¾
Soft " " No. 1	4 @ 4½
White Shavings, No. 2	3¾ @
Mixed " part white	3½ @
Imperfections, No. 2, best folded sheets	3¼ @ 3½
" No. 1, Heavy Stock	3¼ @
Book Stock	3 @
" " Heavy	3 @ 3⅜
" " Light	1¾ @ 1¾
Newspapers	2 @ 2¼
Prints	1¾ @
Pure Manilas	2¾ @ 3
Bogus Manilas and Hardwares	$1.25 @ 1.60
Commons	.90 @ 1.00
Binders' Board Cuttings	1.00 @ 1.25
Straw Board Cuttings, clean	1.00
Woolen Tailor Clips	18 @ 19
Satinet	2½ @ 3½

Paints, Oils, &c.

Paints.

Black Lamp, Coach Painters	₩ lb 20c
" " Ordinary	6c
" Ivory Drop, fair	13 @ 15c
" " best	20c
Black Paint, in oil kegs 8c asst'd cans, 11c	
Blue Prussian, fair to best	40 @ 45c
" " in oil	45 @ 55c
Blue Chinese dry	8@
" Ultramarine	18 @ 20c
Brown, Spanish	1½c
" Van Dyke	10@12c
Carmine, &c	combination price
Green, Chrome	15 @ 23c
" " in oil	14 @ 18 @ 24c
" Paris good, 24c; best, 30c	
" " in oil 30c;	45c
Iron Paint, Bright Red	₩ lb 2½c
" Brown	₩ lb 1½c
" Purple	₩ lb 3c
" Ground in Oil, Bright Red	₩ lb 6½c
" " " Red	₩ lb 5c
" " " Brown	₩ lb 4½c
" " " Purple	₩ lb 6c
Mineral Paints	1¼ @ 4c
Orange Mineral	10c
Red Lead, American	7½c
" " English	none in market
" Venetian (N. C.) dry	$1.65 @ $1.70
" " in oil asst'd cans, 11c; kegs, 8c	
" Indian dry	9 @ 12c
Rose Pink	10 @ 13c
Sienna, American, raw	4c
" Burnt	4½c
" " in oil	10 @ 15 @ 20c
" Raw	11 @ 15 @ 25c
Umber, Burnt	4 @ 8c
" " in oil	9 @ 12 @ 16c
" Raw	3½ @ 7½c
" " in oil	10 @ 15 @ 18c
Vermillion, Chinese	90c
" English	55 @ 57½c
" Trieste	1.10c
" American, Common	14c
White Lead, American, pure dry	8c
" " " in oil	8½ to 9c
White, Paris, English, prime in bbls. 2 @ 2½c	
Yellow Ochre, French	$1.75
" " " in oil asst'd cans, 11c; kegs, 8c	
" " Vermont In casks, 1½c	
Yellow Chrome	17 @ 27c
" " in oil	14 @ 18 @ 25c
Zinc White American No. 1, dry	4 @ 5½
" " No. 1, in oil	9c
" French (Paris)	8 @ 10c
" " in oil	@ 100

Oils.

Linseed, Raw, in casks and bbls.	gal. 43c
" Boiled, "	61c
Bleached Whale	₩ gal. 65c
" Sperm	₩ gal. $1.18
" Elephant	67c
Signal	60c
Prime Lard	68c
No. 1	63c
West Virginia	17c @ 24c
Drilling	40c
Empire Cylinder	65c
Miners' Oil	35 to 45c
Fish Oil, pressed	44c
Neatsfoot	75c
Tallow	9@
Machinery	40c
Engine	30c

Sundries.

Asphaltum	9c
Benzine	₩ gal 16c
Chalk	3½c
" Block	3½c
Dryer, Patent, Am'n asst'd cans, 10½c; keg, 9c	
Frostings	50c
Glue, White	33 @ 44c
" Sheet	30c
Glaziers' Points, Zinc	8c
Gum, Copal	36c
" Damar	25c
" Shellac, English	26c
" " dark	42c
Litharge, English	7½c
Mineral Wool	₩ lb 1¾ @ 1¾c
Pumic Stone, selected Lumps	4 @ 5c
" powdered	2½c
Putty, in bladders	3 c
" in bulk	2½c
Spirits Turpentine	42c
Whiting Spanish	2½c

Glass.

FRENCH WINDOW GLASS.

Prices current per box of 50 feet.

Single Thick.—Discount 45 to 50 %.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 6.50	$ 5.75	$ 5.50	$ 5.25
11 x 14 to 16 x 24	7.25	6.75	6.25	6.00
18 x 22 to 20 x 30	9.25	8.50	7.75	7.25
15 x 36 to 24 x 30	10.25	9.25	8.25	
26 x 28 to 24 x 36	11.00	10.00	9.00	
26 x 36 to 26 x 44	11.75	10.75	9.50	
26 x 46 to 30 x 50	13.25	12.50	10.50	
30 x 42 to 30 x 54	14.00	13.00	11.25	
30 x 56 to 34 x 56	15.00	13.75	12.50	
34 x 58 to 34 x 60	15.50	15.00	13.25	
36 x 60 to 40 x 60	17.50	16.00	15.00	

Double Thick.—Discount 45 to 50 %.

SIZES.	1st.	2d.	3d.	4th.
6 x 8 to 10 x 15	$ 8.25	$ 7.75	$ 7.50	$ 7.00
11 x 14 to 16 x 25	10.00	9.25	8.75	8.25
18 x 22 to 20 x 30	12.75	11.75	10.75	
15 x 36 to 24 x 30	14.25	13.00	11.75	
26 x 28 to 24 x 36	15.25	13.75	12.50	
26 x 36 to 26 x 44	16.25	14.75	13.00	
26 x 46 to 30 x 50	17.50	16.75	14.25	
30 x 42 to 30 x 54	18.50	17.25	14.75	
30 x 56 to 34 x 56	19.50	18.25	16.25	
34 x 58 to 34 x 60	20.50	19.50	18.00	
36 x 60 to 40 x 60	23.00	21.00	20.00	

An additional 10 per cent. will be charged for all Glass more than 40 inches wide. Any size over 52 inches in length, and not making more than 82 united inches will be charged in the 82 united inches bracket.

KIESER'S MEAT CUTTERS

Patented.

Are offered as a first-class Cutter. The Knives are made from **Best Cast Steel.** The **Circular Knives** revolve **between a Comb** of **Permanent Knives** of **same gauge,** making a **Double Shearing Cut,** cutting **faster and finer** than any machine made. The arrangement of the Knives **expels all meats as cut.** Is an excellent **Spice Mill.**

Also, Manufacturers of

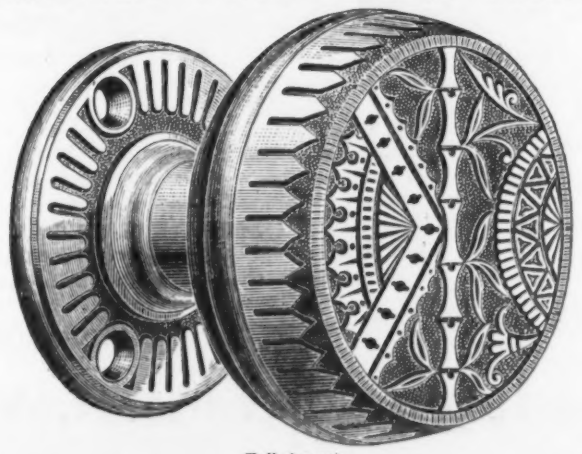
BOSS MOLASSES GATES,
KIMBALL'S PATENT SHOVELS,
LOCKWOOD'S PATENT HOES,

KIMBALL SHOVEL CO., Sole Manufacturers,

Office, 67 German Street, - BALTIMORE, MD., U. S. A.

BRANFORD LOCK WORKS,

ORIENTAL PATTERN KNOBS.



Full size cut.

We have issued, under date of June 10, a complete revised Price List, a copy of which, with our 1879 Illustrated Catalogue, will be furnished to the trade free on application. Said Catalogue contains illustrations and descriptions of over 1000 different varieties of Door Locks, Knobs and Escutcheons.

MANUFACTORY AND OFFICE,

BRANFORD, CONN., U. S. A.

PATENT **Elliptic Spring Whistles** FOR **SPEAKING TUBES.** Patented April 25th, 1879.

We call the attention of the trade to the whistle for speaking tubes, represented in above cut, as being superior, in a mechanical point of view, on account of the

PATENT ELLIPTIC SPRING,

which is much less liable to break and get out of order than the spiral spring usually used. These whistles being made entirely of metal, are very strong and durable. They are offered in a variety of styles at very reasonable prices. Send for illustrated circular and quotations.

We also invite an examination of our **PATENT REVERSIBLE DOOR LOCKS,** which by their peculiar construction, combine **simplicity, strength and durability.** In these Locks the combination of the Patent Lever and Spring renders the latch movement very easy and prompt in action.

Illustrated catalogues and price lists furnished on application.

TRENTON LOCK AND HARDWARE CO.,

Manufacturers of **Superior Building Hardware.** Trenton, N. J.

AGENTS.

JAMES M. VANCE & Co., 211 Market St., Philadelphia, Pa. ; JAMES MARSHALL, 48 Warren St., New York.

R. J. ANDERSON, President. A. B. PARKER, Vice-Pres. JAS. A. VAN BRUNT, Sec'y & Treas.

NEW YORK WIRE AND WIRE ROPE CO.

Manufacturers of

WORKS:
South Brooklyn AND Mott Haven, N. Y.

WIRE ROPE

New York Office: 23 Astor House.

WIRE, FURNITURE SPRINGS & UMBRELLA FRAMES.

LAFLIN MFG. CO., Westfield, Mass,

Manufacturers of

PAT. IMPROVED STEAM HEATING APPARATUS.

LAFLIN MFG. CO.'S

Pat. Single Iron Plane

Made of extra quality iron. A practical labor-saving tool. Cuts against the grain equally as well as with it. Can be adjusted instantly to cut a coarse or fine shaving, and excels any double iron plane ever produced.

PATENTS

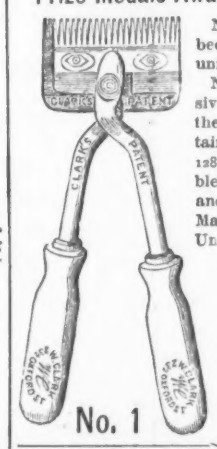
303 Euclid Ave., Cleveland, O. | TRACY, DYER & WILBER, Solicitors and Counsel in Patent Litigation | 519 Seventh St., Washington.

Send for "ALL ABOUT PATENTS," 140 Pages—Free.

CLARK'S PATENT

ENGLISH HORSE CLIPPERS.

Prize Medals Awarded, Paris, 1878. Grand Prize Awarded, Sydney, 1879.



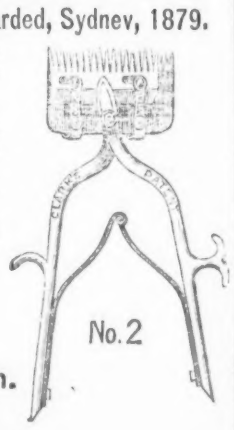
No. 1

No. 1. This well-known instrument has now been before the Public for 12 years, and has given universal satisfaction.

No. 2. One-handed Clipper for Heads. Extensively used by all Barbers, and has been before the Public for the last seven years. To be obtained wholesale, of Messrs. Moseman & Bro. 128 Chambers St., New York, Messrs. I. Hambleton & Son, 221 Spruce St., Philadelphia, Pa., and Messrs. Field, Luter & Co., Madison and Market Sts., Chicago, and all Merchants in the United States, and of the Patentee,

W. CLARK,

232 Oxford St., London.



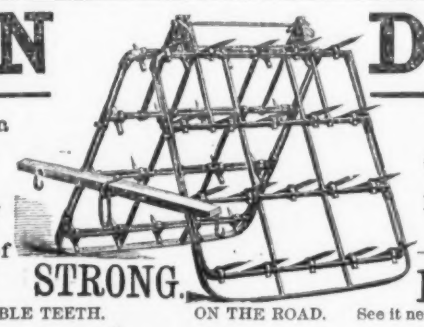
No. 2

AGENTS WANTED.

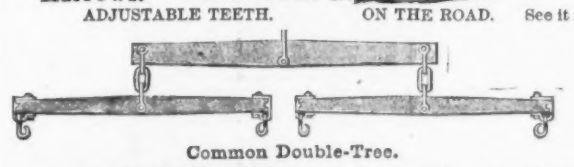
IRON DUKE

Successful in a Competitive Test at Xenia and Dayton, over twelve and fourteen of the Leading Harrows.

First Premium at the Ohio State Fair, over Forty-Four Competitors.



STRONG. ADJUSTABLE TEETH. ON THE ROAD. DURABLE. See it next week in the field.



Common Double-Tree.

Fredrick's Patent.

If wood breaks, the irons can be removed and placed on new wood by any farmer.

Write for Prices and Discounts.

We have a line of Equalizers, Double and Single-Trees that are Unsurpassed for Utility.

Manufactured Exclusively by

R. P. Kimberlin & Co.

25 West Georgia St. INDIANAPOLIS, IND.

HENRY CHENEY'S

CELEBRATED

Hammers

FOR EXPORT.

Factory at Little Falls, N. Y., U. S. A.

SABIN MFG. CO.,

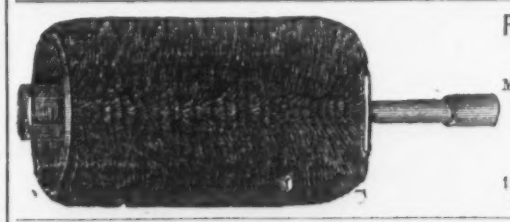
MONTPELIER, VT., MANUFACTURERS OF

DOUBLE-ACTING SPRING BUTTS,

SABIN'S LEVER DOOR SPRINGS, For heavy doors,

BOSS AND CROWN SPRINGS, For light doors.

Send for Catalogue. Represented in New York by *DAVID HYMES & CO., 92 Church St.*



PATENT STEEL TUBE AND FLUE BRUSH.

Manufactured and for sale in the

L. B. Flanders Machine Works,

1025 Hamilton St., - - - PHILADELPHIA.

Descriptivecircular on application.

CHAMPION **HOG RINGER** RINGS and HOLDER. Only double Ring ever invented. The only Ring that will effectually keep Hogs from rooting. No sharp points in the nose.

EAGLE BILL **CORN HUSKER** is the best Husker in the market. Farmers say it is the best. Use no other.

BROWN'S **HOG AND PIG** RINGER and RINGS. Only single Ring in the market that closes on the outside of the nose. No sharp points in the nose to keep it sore.

Ringers, 75c. Rings, 40c. 10c. Holders. 75c. Huskers, 15c.

CHAMBERS, BERING & QUINLAN, Exclusive Manufacturers, Decatur, Ill.

Beardsley Scythe Co.,

Manufacturers of

GRASS, GRAIN & BUSH SCYTHES,

Hay Knives & Corn Knives.

West Winsted, Conn.

See our advertisement in *The Iron Age* first issue of each month.

COXE BROS. & CO.,

Cross Creek Lehigh Coal.

The Purity and Strength of this Coal especially adapt it for the working of Iron and Metals.

GENERAL OFFICE, Room 12 Trinity Building, 111 Broadway, New York.

BRANCH OFFICES, Chicago, Ill., 90 LaSalle Street. Philadelphia, 206 Walnut Place.

E. B. & S. W. ELY, Agents, P. O. Box 262, N. Y.

TO NICKEL PLATERS.

American Nickel Works,
Camden, N. J., Aug. 1, 1880.

ANODES.—I am now prepared to supply **PURE ROLLED NICKEL ANODES** in any quantity.

These superior Anodes wear away in the solution evenly and completely, like rolled silver or copper plates, thus avoiding the vexation and loss caused by the crumbling and breaking of cast Anodes. They plate very evenly and regularly.

Though necessarily higher in price per pound, they are so much thinner (usual thickness 3-32 inch) that to furnish a tank of any given size costs but about half as much as if furnished with cast Anodes.

Though perfectly protected by my patent for Malleable or Rolled Nickel Anodes of Jan. 6, 1880, as well as by Dr. Fleimann's patent for making nickel malleable (of which I am sole and exclusive American licensee),

I make no charge of royalty for the use of these Anodes,

which are quite free from any patent claim of any other parties for Nickel Anodes.

SOLUTION.—In order to meet the wants of those who prefer to make their own solutions, I now make **NICKEL OXIDE** of high purity and easily soluble in any acid. It is better for this purpose than metallic nickel or nickel carbonate.

I also make and offer for sale Cast Nickel Anodes and Nickel-Ammonia Sulphate. Pure Grain Nickel always on hand. Malleable Nickel Castings made to order.

All these articles, being made with the greatest care from the ores of my own nickel mine, can be depended upon as of the highest quality and greatest uniformity.

ROLLED NICKEL ANODES.... $2.50 per lb.
NICKEL OXIDE ..... 1.50 "

JOSEPH WHARTON.
Post Office Address,
P. O. Box 2786, Philadelphia.

WESTON DYNAMO-ELECTRIC MACHINE

NICKEL.

The rapid increase in the use of Nickel-Plating owing to the introduction of the Weston Machine and the very low price of nickel material, enables us to give greatly reduced estimates for complete outfits.

We are furnishing outfits specially adapted for Stove Work, giving a pure white deposit on plain or mat surfaces.

Outfits complete, with Dynamo-Electric Machine Tanks, Anodes, Solution, &c., &c., $250.

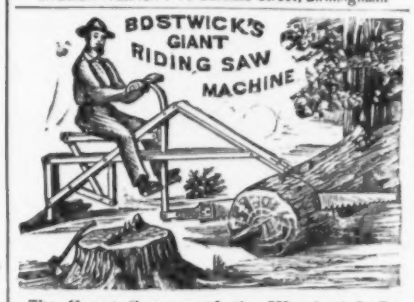
We beg to refer to the following Stove Manufacturers among 500 other houses using the Weston Machine: Richardson & Boynton, S. S. Jewett & Co., Fuller, Warren & Co., Perry & Co., Detroit Stove Works, Michigan Stove Co., Co-operative Stove Co., E. & C. Gurney, Hamilton & Toronto, and many others

INFRINGEMENTS.

We call attention to infringements of the Weston Machine, in which Automatic Switches are used to prevent change of current. The Weston Co. are owners by grant or purchase of all forms of Automatic Switches for Plating Machines. The adoption of these machines will certainly lead to great loss to parties purchasing or using them.

CONDIT, HANSON & VAN WINKLE
Sole Agents NEWARK, N.J. U.S.A.

NEW YORK OFFICE, 92 & 94 Liberty St.
ENGLISH AGENCY: 18 Caroline Street, Birmingham.



The **Great Success** of the **Wonderful Improved Labor-saving BOSTWICK'S GIANT RIDING SAW MACHINE** is fully demonstrated by the large number in use and present demand. It saws logs of any size. One man can saw more logs or cord wood in one day, and easier, than two men can the old way. It will saw a 2-foot log in three minutes. Every farmer needs one. Township agents wanted. Send for illustrated circular and terms.

Address, FARMER'S MANUFACTURING CO., 178 Elm Street, Cincinnati, Ohio.

THE SLAYTON RAZOR.

PERFECTION For Portability. For Cutting Quality. For Temper.

Handles of German Silver, Nickel Plated. Blades of the Finest Steel in the World. Every Razor Fully Warranted.

L. C. TOWER, Thermometer Manufr.,

39 Exchange St., Rochester, N. Y., Sole Agent.

Canvassers wanted. Sample by mail, $1.

J. STEVENS & CO.,

Chicopee Falls, Mass., P. O. Box 224,

Manufacturers of

SPRING CALIPERS & DIVIDERS.

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See Page 3.

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And grades of Steel specially adapted for Lathe Tools, Chisels and Taps and Dies.

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BLACK LEAD STOPPERS,

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All the regular sizes in stock, with Nozzles to fit each size. Special sizes or shapes made to order from sample or drawing.

Black Lead Crucibles, all kinds and sizes.

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Anvils.
Peter Wrights, ₩ lb ..10¾c
Over 250 lbs ..11c
Eagle (American) ..10c ₩ lb—dis 20 %

Apple Parers.
Keystone Centennial, 1875 ..$4.25
" 1877 .. 5.00
Reading No. 72 .. 5.00
" No. 74 .. 6.00
" No. 75 .. 7.00
" No. 78 .. 7.50
Rotary Peach Parers .. 13.50
Lots of 10 to 25 dozen special prices.

Axes.
Hunt's Kentucky and Yankee ..per doz $11.00
Mann's Red Warrior .. " 11.00
Richland Chief .. " 10.00
Beveled Axes .. add 50c " net
Double Bit Axes .. net " 22.00

Augers and Auger Bits.—New List January 1.
Bates' Nut Augers ..dis 40 %
Cook's Augers ..dis 40&10 %
Watrous' Ship Augers ..dis 15 %
Benjamin Pierce Auger Bits ..dis 35 %
Griswold Auger Bits ..dis 40 %
Cook's " ..dis 40&10 %
Jennings' " ..dis 10, 10&10 %
Bonney's Pat. Hol. Augers, list $48 ₩ doz..dis 25&10 %
Stearns' Pat. Hol. Augers, list $48 ₩ doz....dis 20&10

Balances.
Light and Common ..dis 15&10 %

Bells.
Bevin Bros. Mfg. Co. Light Hand Bells....dis 60&10 %
Swiss Pattern Hand Bells..low list dis 10&10 %
Connell's Door Bells ..dis 35 %
Gt. Western & Kentucky Cow, new list ..dis 50 %

Bolt and Rivet Clippers.
Chambers' No. 1. for ⅜ bolt ..each, $7.50 } dis 15 %
" No. 2, " ½ " .. " 9.00 }
" No. 3, " ⅝ " .. " 12.00 }

Boring Machines.
Upright, without Augers ..List 5.50 } dis 40 %
Angular, without Augers .. " 6.75 }

Bolts.—Eastern Carriage Bolts ..dis 8c %
Philadelphia " ..new list dis 60&10 %
Stanley, Wrought Shutter ..dis 50&10 %

Braces.—Barber's ..dis 40&5 %
Backus ..dis 60 %
Spofford ..dis 50&5 %
American Ball ..dis 40&10 %

Butts.—Cast Fast Joint, Narrow ..dis 40&10 %
" " Broad ..dis 40&10 %
Cast Loose Joint, Narrow ..dis 50&10 %
" " Broad ..dis 50&10 %
" Acorn, Loose Pin ..dis 50&10 %
" " Jap'd ..dis 55&10 %
" Mayer's Loose Joint ..dis 55&10 %
Wrought Loose Pin ..dis 50&10 %
" Table Hinges and Back Flaps ..dis 40&10 %
" Narrow, Fast ..dis 40&10 %
" Loose Joint ..dis 50&10 %

Blind Butts.
Parker ..dis 60, 10&10 %
Clark ..dis 60, 10&10 %
Shepard ..dis 60, 10&10 %
Lul & Porter ..dis 60&10 %
Huffer's ..dis 15 %

Chains.—German Halter and Coil, new list Oct. 22, 1879 ..dis 40 %
Galvanized Pump ..₩ lb 10c net
Best Proof Coil Chain—English.

₩ lb	12	10	8½	7½	7¼	7	gold
	3-16	¼	5-16	⅜	7-16	½	in.

Chisels.—Socket Framing ..dis 65&10 %
Socket Firmer ..dis 65&10 %
Butche 's ..$5.00 to £ gold

Casters.—Bed (new list July 1, 1880,) ..dis 25&10 %
Plate ..dis 25&10 %

Coffee Mills.—Box and Side, new list Jan. 1, 1880 ..dis 35 %
Enterprise ..dis 20 %

Cutlery.—Walden Pocket ..new list net
Landers, Frary & Clark, J. Russell & Co., Lamson & Goodnow Mfg. Co. and Meriden Cutlery Co., Manufacturers' prices net.

Drawing Knives.
Hart Mfg. Co.'s ..dis 65&10 %
Adjustable Handle ..dis 15 %

Fry Pans.
Tinned ..dis 45 %

₩ doz.	$3.50	4.00	4.50	5.00	5.50	6.50	7.50	9.00	10.00
No.	0	1	2	3	4	5	6	7	8

Burnished ..dis 55 %

₩ doz.	$3.00	3.75	4.25	4.75	5.25	6.00	7.00	8.00	9.00
Fo.	0	1	2	3	4	5	6	7	8

Files.
Nicholson ..dis 30 %
Disston ..dis 30 %
Butcher ..$4.50 £
Spencer ..$4.50 @ 4.75 £

Fluting Machines.
Eagle—2¼ in. roll ..each, $2.15 } dis 10 %
" —2¼ in. roll .. " 2.85 }
Crown—4½ in. roll .. " 3.50 }
" —6 in. roll .. " 4.00 } dis 10 %
" —8 in. roll .. " 6.50 }
Geneva Fluter ..dis 20 %
Favorite oom Fluter & Sad Iron ..₩ doz $10.50 net

Hammers.
Yerkes & Plumb's, new list ..dis 30 %

Hatchets.
Yerkes & Plumb, new list ..dis 30 %
Hunt ..dis 15&5 %

Hinges.
Strap and T ..dis 45&10 %

Horse Nails.

	Nos.	5	6	7	8	9	10
Ausable		30	27	24	24	23	22
" Pol'ed & P't'd and Blued and Pointed.		31	28	2	25	24	23
Globe	New list.	28	25	23	22	21	20
Clinton		22	20	19	18	17	
" Polished & Pointed		23	21	20	19	18	

Porter, all sizes ..₩ lb 15c. net
Discount on Ausable and Clinton, 20 %; Globe, 10%

Locks and Knobs.
Branford ..dis 50&2 %
Gaylord Cabinets ..dis 10&2 % cash
American Padlocks ..dis 40 &2 % cash
Scandinavian Padlocks ..dis 50 %

₩ doz.	$5.00	5.50	6.50	7.50	8.50	10.00	12.50	} dis 60 %
No.	57	58	59	60	61	62	63	
₩ doz.	$18.00		26.00		33.00			} dis 60 %
No.	64		65		66			

Lanterns.
Nail City ..₩ doz, $9.00 net
Square Candle and Oil ..₩ doz
Tubular ..No. 0, $8.65; No. 1, $10.15 ₩ doz net
Globes, 35 cents extra per doz. net.

Lawn Mowers.—Pennsylvania ..dis 30&10 %
Philadelphia ..dis 30&10 %
Excelsior ..dis 30&10 %

Lawn and Garden Pumps.
Holland Patent ..List $5.00 dis 10 %

Mattocks.
Long and Short Cutter ..new list
Pennsylvania Pattern ..per doz

Molasses Gates.
Enterprise Mfg. Co.'s Measuring Faucets ..dis 20 %
Stebbins' Gates ..dis 50&10 %
Lincoln's " ..dis 50&10 %
Landers, Frary & Clark's Petroleum ..dis 20&10 %
Brass Liquor Cocks, new list Jan. 1 1880 ..dis 40 %
Cork Lined " ..dis 70 %

Meat Cutters.—Pennsylvania Meat Cutter ..dis 50 %
Dixon's ..dis 30 %
Woodruff ..dis 30 %
Stowe ..dis 30 %
Hale's ..new list, dis 40, 2&10 cash
American ..dis 25 %
Stuffers ..dis 25 %
Enterprise Stuffers ..dis 20 %

Planes.—Ohio Tool Co ..dis 25 % }
Scioto ..dis 30 % } 7½ % cash
Auburn ..dis 25 % } in 10 days.
New York Tool Co ..dis 30 % }
Bailey ..dis 20&10 %

Plane Irons.—Ohio Tool Co ..dis 10&5 %
Butcher's ..£, $5.50

Plumbs and Levels.
Stanley's Adjustable ..dis 60&10 %
" Non-Adjustable ..dis 60&10 %

Picks.—New list.

Pumps.—Bickford ..$5.00, dis 10 %

Rules.—Stanley Boxwood ..dis 60 %10 %
Stanley Ivory ..dis 40&10 %

Steelyards.—Hart's Pattern ..dis 30&10 %

₩ doz.	$14.50	17.75	21 00	26.50	31 00	35.50
Lbs	50	100	150	200	250	300

American Pattern ..dis 30&10 %

₩ doz.	$8.00	10.25	13.75	15.60	16.75	19.50
Lbs.	50	100	150	200	250	300

Squares.
Steel and Iron ..dis 50 %; full case, dis 50&10 %
Try Squares, Stanley ..dis 45&10 %
Disston's Try Squares ..dis 12½ %

Scythes.—Golden Clipper, Damascus Blade, Boxed and Sharpened ..₩ doz $9.00 net
Clipper No. 10, Bronzed Blade, Boxed and Sharpened ..₩ doz $8.50 net
Clipper No. 5, Painted Red, Boxed and Sharpened ..₩ doz $8.00 net

Saws.—Disston's Hand, Panel and Rip ..dis 20 %
Disston's Circular ..dis 35 %
Cross-Cut No. 2, Plain Tooth ..dis 25%
" Patent Tooth ..dis 25%
" Champion Tooth ..dis 25%
Boynton's Lightning Cross Cut, new list ..dis 20 %
" One Man, all lengths, " ..dis 20 %
" Billet Webs, 30 inch, " ..dis 25 %
" Lightning Buck Saws, cross bar ..dis 25 %
" " Hand, Panel and Rip ..dis 25 %

Shovels and Spades.
Rowland ..dis 40&10 %
Oliver Ames & Sons, new list ..dis 10 %
Griffith ..dis 40&10 %

Sad Irons.—4 to 10 lbs ..₩ lb 33½c
Mrs. Potts' Patent ..dis 30 %

Stone.—Arkansas Oil Stone ..₩ lb $2.00 net
Washita Extra ..₩ lb 27c net
" No 1 .. " 18c
" No. 2 .. " 15c
" Slips .. " 36c
" Axe .. " 18c net
Turkey Oil Stone No. 1 ..₩ lb $1.00 net
Hindostan Oil Stone No. 1 ..₩ lb 6c } dis 30 & 10 %
" Axe Stone .. " 8c }
" Slips .. " 100 }

Screws.
Flat Head Iron ..dis 45 %
" Brass ..dis 35 %
Round Head Brass ..dis 20 %
" Iron ..dis 35 %

Spoons.
Plated ..dis 33⅓&5 %
German Silver ..dis 20&10 %
Britannia, Boardman's ..dis 55 %
" Parker's ..dis 55 %
Tinned ..dis 10 %

Springs.—Torrey ..₩ doz $2.10 10 %
Philadelphia ....5 in., $5.00; 8 in., $7.00 ₩ doz. dis 25 %
Chatfield No. 1, $2.75; 2, $2.25; 3, $1.00 ₩ doz, dis 33⅓%
Gem Coil No. 1, Large Jap'd ..₩ doz $3.50 }
" No. 2, Medium Jap'd .. " 2.50 } net
" No. 3, Small Jap'd .. " 2.00 }

Stocks and Dies. ..dis 10&5 %

Stove Polish.—Gem ..₩ gross, $4.50, dis 5 %
Dixon .. " 5.75 net
Onyx .. " $4.00 @ 4.25 net

Tacks, Brads, &c. ..dis 20&10 %
Shoe Nails—4-8, 5c; 3½-8, 10c ₩ lb ..10 %
Double Pointed Tacks ..dis 40&5 %

Traps.
Genuine Oneida—Newhouse ..dis 30 %
Im. Oneida—Newhouse list, first qual ..dis 50 %

Vises.—Solid Box, Trenton new list ..dis 25 %

Wrenches.—Agricultural ..dis 60&10 %
Coes' Genuine ..dis 50 %
" " Mechanics' ..dis 50&10 %
" " Mail. Bar ..dis 70 %
Philada. Tool Co., Duplex ..dis

Wire.
Bright or Ann'd, No. 0 to 18 ..dis 45 to 50 %
" " No. 19 to 26 ..dis 52½ to 57 %
" " No. 27 to 36 ..dis 60 to 65 %
Coppered, 0 to 18 ..dis 40 to 45 %
Tinned Broom Wire ..dis 47½ to 50 %
Galvanized No. 7 to 18....Market List, dis 35 to 37½ %

Wringers.
Peerless No. 2½ ..$60.00
" " 2 .. 63.00
Universal, No. 2½ .. 60.00
" " 2 .. 63.00
Novelty, No. 10 .. 60.00
" " 2 .. 63.00

PITTSBURGH.

Merchant Iron.

TERMS.—Note or acceptance at 60 days, with current rate of exchange on New York, or a discount of 2 per cent. for cash, if remitted within 10 days from date of invoice.

Flat Bar.

1½ to 4 by ⅜ to 1 inch ..2.5c
4¼ to 6 by ⅜ to 1 " ..2.6c
1¾ to 6 by 1⅛ to 1¼ " ..2.9c
1¾ and 1⅜ by ⅜ to ¾ " ..2.6c
1 and 1⅛ by ⅜ to ¾ " ..2.7c
⅝, ¾ and ⅞ by ⅜ to ⅝ inch ..2.9c

Rounds and Squares.

1 to 1⅞ ..2.5c | ⅝ to 9-16 ..2.7c
2 to 2⅝ ..2.7c | ½ to 7-16 ..2.9c
2¾ to 3¼ ..3.0c | ⅜ ..3.1c
3⅜ to 4 ..3.5c | 5-16 ..3.3c
4¼ to 6 ..4.0c | ¼ ..3.5c
⅞ to ⅜ ..2.6c | 3-16 ..5.5c

Oval Iron.

⅞ to 1¼ ..2.9c | ⅛ ..3.3c
⅝ to ¾ ..3 1c | ⅜ ..3.7c

Half Oval and Half Round.

⅞ to 1¼ inch ..3.2c | ⅛ inch ..4.0c
⅝ to ¾ " ..3.7c | ⅜ " ..5.5c

Horse Shoe.

⅝ to 1⅛ by 5-16 to ⅞ inch ..3.5c

Wagon Box Iron.

⅞ Inch, Nos. 13 and 14 ..3.7c
⅞ " " 11 and 12 ..3.5c
⅞ " " 13 and 14 ..4.0c
⅞ " " 11 and 12 ..3.8c
⅝ " " 13 and 14 ..4.4c
⅝ " " 11 and 12 ..4.1c

Heavy Bands.

3½ to 6 by ¼ and 5-16 inch ..2.7c
1⅛ to 3¼ by ¼ and 5-15 " ..2.7c
1 to 1⅜ by ¼ and 5-16 " ..2.8c
⅝ to ⅞ by ¼ and 5-16 " ..3.0c
⅝ and ⅞ by ¼ and 5-16 " ..3.4c

Light Bands.

1½ to 6 by 1/16 to 3-16 ..3.0c
1½ to 6 by Nos. 11 and 12 ..3 1c
1 to 1⅜ by 1/16 to 3-16 ..3.1c
1 to 1⅜ by Nos. 11 and 12 ..3.2c
⅞ and 13-16 by 1/16 to 3-16 ..3.4c
⅞ and 13-16 by Nos. 11 and 12 ..3.5c
¾ and 11-16 by 1/16 to 3-16 ..3.7c
¾ and 11-16 by Nos. 11 and 12 ..3.8c
⅝ and 9-16 by 1/16 to 3 16 ..4.0c
⅝ and 9-16 by Nos. 11and 12 ..4.1c
½ inch by 1/16 and 3-16 ..4.3c
½ inch by Nos. 11 and 12 ..4.4c

Hoop Iron.

1¼ to 4, Nos. 13, 14 and 15 ..3.3c
1¼ to 2, Nos. 16, 17 and 18 ..3.4c
1¼ to 2, No. 19 ..3.5c
1¼ to 2, No. 20 ..3.6c
1¼ to 2, No. 21 ..3.7c
1¼ to 2, No. 22 ..3.8c
15-16, 1, and 1⅛, Nos. 13, 14 and 15 ..3.5c
15-16, 1, and 1⅛, Nos. 16, 17 and 18 ..3.6c
15-16, 1, and 1⅛, Nos. 19 and 20 ..3.7c
15-16, 1, and 1⅛, No. 21 ..3.8c
15-16, 1, and 1⅛, No. 22 ..3.9c
⅞, Nos. 13, 14 and 15 ..3.7c
⅞, Nos. 16, 17 and 18 ..3.8c
⅞, Nos. 19 and 20 ..3.9c
⅞, No. 21 ..4.0c
⅞, No. 22 ..4.1c
13-16, Nos. 13, 14 and 15 ..3.9c
13-16, Nos. 16, 17 and 18 ..4.0c
13-16, Nos. 19 and 20 ..4.1c
13-16, No. 21 ..4.2c
13-16, No. 22 ..4.3c
¾, Nos. 13, 14 and 15 ..4.0c
¾, Nos. 16, 17 and 18 ..4.1c
¾, Nos. 19 and 20 ..4.2c
¾, No. 21 ..4.3c
¾, No. 22 ..4.4c
11-16, Nos. 13, 14 and 15 ..4.2c
11-16, Nos. 16, 17 and 18 ..4.3c
11-16, Nos. 19 and 20 ..4.4c
11-16, No. 21 ..4.5c
11-16, No. 22 ..4 6c
⅝, Nos. 13, 14 and 15 ..4.4c
⅝, Nos. 16, 17 and 18 ..4.5c
⅝, Nos. 19 and 20 ..4.6c
⅝, No. 21 ..4.7c
⅝, No. 22 ..4.8c
⅝, No. 23 ..4.9c
9-16, Nos. 13, 14 and 15 ..4.6c
9-16, Nos. 16, 17 and 18 ..4.7c
9-16, Nos. 19 and 20 ..4.8c
9-16, No. 21 ..4.9c
9 16, No. 22 ..5.0c
9-16, No. 23 ..5.1c
½ inch, Nos. 13, 14 and 15 ..4.8c
½ " Nos. 16, 17 and 18 ..4.9c
½ " Nos. 19 and 20 ..5.1c
½ " No. 21 ..5.2c
½ " No. 22 ..5.3c
½ " No. 23 ..5.4c

The prices under Hoop Iron do not apply to Cotton Ties.

1-10c per lb. extra will be charged for each gauge lighter than the lightest indicated.

1-10c per lb. extra will be charged for cutting Hoops to specified lengths.

Barrel Hoops.

1¼ to 2 in., cut to length.

9 to 11 lbs, per set of 6 hoops ..3.5c
8 lbs. and less than 9 lbs. per set of 6 hoops ..3.6c
Less than lbs. per set of 6 hoops ..3.8c

Extras for Cutting to Length all Preceding Iron.

All Iron, including Tire ..1.10c

Tank Iron.

No. 9 and heavier ..3.3c
Plow Slabs ..3.5c
" Wings ..3.8c

Sheet Iron.

	Common.	Charcoal.	Juniata.
No. 10 to 14	3.5c	5.0c	6.5c
No. 15 to 17	3 8c	5.3c	6.8c
No. 18 to 21	4.1c	5.6c	7.1c
No. 22 to 24	4.3c	5.8c	7.3c
No. 25 & 26	4.5c	6 0c	7.5c
No. 27	4.7c	6 2c	7.7c
No. 28	4.1c	6.6c	8.1c

All sheets No. 18 and lighter, over 30 inches wide, not less than 2.10c extra.

Wood's Patent Planished Sheet.

1st quality (A) ..12c | 2d quality (B) ..10½c

Galvanized Iron—Juniata.

Nos. 14 to 20 ..12c | No. 27 ..15c
Nos. 21 to 24 ..13c | No. 28 ..16c
Nos. 25 and 26 ..14c | No. 29 ..18c
Current discount to jobbers, 1st quality, 27½ %; 2d quality, 37½ %.

Coal Screen Iron.

4¾ by ⅝ by 5-16 ..2.0c | 1 by ⅝ by 5-16 ..3.5c

Angle Iron.

2½, 3, 3½ and 4 inch ..3.3c
1⅝, 1¾, 2 and 2¼ inch ..3.3c
1¼ inch ..3.4c
1 " ..3.5c
1½ by 1 inch, for Plow Handles ..3.8c
1½ by ¾ " " " ..3.8c
1⅜ by ¾ " " " ..3.9c

T Rail.

8 lbs. to the yard ..2.9c | 20 lbs. to the yard ..2.9c
12 " " ..2.9c | 28 " " ..2.9c
16 " " ..2.9c | 40 " " ..2.9c

Splice Joints for 12, 16 and 20-lb. Rail, 40c each; 28 and 30 lb. Rail, 50c each; 40 lb., 60c each.
3½ by ⅜ and ½ Spikes for 20 and 28-lb. Rail ..4½c
2½ and 3 by ⅜ " " 12 and 16-lb. " ..4½c
2½ by 5-16 " " 8-lb. Rail ..5½c

Flat Rails.—Punched and Countersunk.

1¼ to 2 by ¼ to ⅝ inch ..3.0c
1½ by ⅜ and 7-16 inch ..3.2c
1¾ by ⅜, 7-16 and ½ inch ..3.5c

Juniata Nail Rods ..6.5c
Norway ..8.0c
Guard Iron, ⅞x¾x⅜ and ⅞x⅝x⅜ ..4.0c
" ⅝x⅝x5-16 and ⅞x⅝x¼ ..4.2c
Drag Bars ..3.3c
Dropper Bars ..3.8c
Cylinder and Landside Iron ..3.8c
Plow Beam Iron ..3.0c

Nails.
10d to 60d ..$3.00

Best Quality Refined Cast Steel.

Square, Flat, Octagon and Round.

⅛ to 2 inches, inclusive ..13 c
5-16 and 2½ to 3 inches ..14 c
¼ and 3⅛ to 4 " ..15 c
7-32 and 4¼ to 5 " ..16 c
3-16 and 5⅛ to 6 " ..19 c
5-32 inch ..23 c
⅛ inch ..31 c
Oil Well Steel Forgings ..21½c
No grade of Crucible Tool Steel shall be sold for less than above prices.

Machinery Steel.

	Crucible.	Bessemer & Open Hearth.
Ordinary Sizes, ⅜ to 2 inch		
Round	7½c	6c
5-16 and 2⅛ to 3 inches	8½c	7c
¼ and 3⅛ to 6 "	9½c	8c
7-32 inch	10½c	9c
3-16 "	12½c	11c

Square, Flat and Octagon, ½c extra throughout the list.
Cut to specified lengths, ½c extra.

Hammer Cast Steel.

2 inches and under ..8½c
Above 2 inches ..9½c

Sheet Steel.—Crucible.

	Best.	2d Qual.	3d Qual.	Bessemer & Open Hearth.
To 21 gauge	13c	11c	9c	6½c

1c. extra for each additional gauge.
Cut to multiples or specified lengths, ½c. extra.

Miscellaneous Cast Steel.

Auger and Auger Bit ..8½c
Axle Steel for carriages and wagons ..8½c
Frog Points and Plates ..10c
" Side Bars ..8c
Pick, plain ..9c
" and Mattock, beveled ..9c
Skate Steel ..8½c
Table Cutlery ..9c
Pike and Cant Hook ..9c
Coal and Granite Wedge ..9c
Roller ..7½c
Spindle, subject to Machinery classification ..8½c
Trap Spring Steel ..9½c
Forged Crank Pins and Lathe Spindles ..10½c
Piston Rods, plain ..8c
" forged to shapes ..10½c
Slide Bars, plain ..8c
" forged to shapes ..10½c

Crucible, Open Hearth or Bessemer.

Boiler, Fire-Box and Flue Sheets, not less than 3-16 thick ..2.6c
Boiler, Fire-Box and Flue Sheets, not less than ⅜ thick ..2.7c
Circulars and semi-circulars, when ordered separately ..3.5c
Smoke Stack, to shape ..4.5c
Locomotive Tank Steel ..4.5c

File Cast Steel.

Square, Round, Half Round and Flat Bastard, 8-inch and over ..9c
Mill Saw, 8-inch and over ..9½c
Taper, 3½-inch and over ..10½c
Horse and Shoe Rasp ..9½c

Spring Cast Steel.

Spiral and Taper, cut to lengths ..7½c

Tire Cast Steel.

Fork and Rake, Crucible ..8c
1x¼ and over ..8c
1x3-16, ¾x3-16 and ¼ ..8½c
1 and 13-10x⅛ and 5-32, ⅝x3-16 and 5-32 ..9c
⅜ and ⅝x¼ and 3-32 and 12 g ..9½c
Solid Safe Cast Steel ..7½c

Agricultural Implement Cast Steel.

Fork and Rake, Crucible ..8½c
Horse Rake Steel, cut to lengths, Crucible ..9 c
Hoe, Crucible ..8 c
Corn Stalk Cutter, beveled ..9 c
Beveled Hoe and Shovel Steel in Bars ..9 c
Crucible Plow Steel in slabs ..8½c

Bessemer and Open Hearth.

Spring ..5½c
" spiral and taper, cut to lengths ..6½c
Tire, 3-16 thick and above ..5½c
Toe Calk ..5½c
Plow ..5½c
Axle Billets ..5c
Sleigh Shoe ..5c
Cutter Shoe, cut to lengths and tapered ..6½c
Scythe Back Steel ..5c
Grain Drill Bars ..5c
" Points ..8½c
Rolling Coulter Blanks, cut and punched ..9½c
Thrasher Steel ..10½c
" Teeth ..5½c
Rolled Hammer Billets ..5½c
Where Bessemer or Open-hearth Steel can be used in place of Crucible, the difference in price shall not be greater than 1c. per lb., except where especially provided in the list.
Terms.—Four months; 3 per cent. discount for cash, if remitted within 30 days.

Rolls and Castings.

Furnace, Floor and Straightening Plates ..2½c
Housings and Castings not otherwise specified ..3 c
Guide Plates ..3½c
Spindles and coupling boxes ..3 c
Sand Rolls and Pinions, large size ..3 c
" " small size ..3½c
Pipe Mill Castings ..5 c
Rolling Mill Castings under 50 lbs ..4 c
Spur and Bevel Wheels, large ..3½c
" small ..4½c
Pulleys up to 30 inches ..4½c
" over 30 inches ..4¼c
Engine Castings, light ..4½c
" " heavy ..4 c

Chilled Rolls.

6 to 7 in. diam., 7 to 20 in. long ..6½c
8 to 15 in. " 8 to 40 in. " ..5½c
25 to 24 in. " 15 to 77 in. " ..5 c
14 to 31 in. " 72 to 108 in. " ..5 c

White and Red Lead.

Strictly Pure White Lead in Oil, in kegs, in lots of 500 ₩ and over, 9c; less than 500 ₩, 9½c in 25 and 50 ₩ Tin Pails, ½c. ₩ ₩ over keg price; 12½ ₩ Tin Pails. 1c ₩ ₩ over keg price; assorted, 1 to 5 ₩, 100 ₩ Cases, 12c.
Dry White Lead..less than 500 lbs..8¾c; over 500 lbs. 8½c
Orange Mineral, genuine, in kegs, 10c; in barrels, 9 c
Red Lead, very brilliant, " 8c; " 7½c
Litharge (Potter's Lead) " 8c; " 7½c
Freights equalized with all points.
Terms: Notes at sixty days, or if paid within 15 days from date of invoice, a discount of 1% per cent. will be allowed, but not otherwise.

Window Glass.

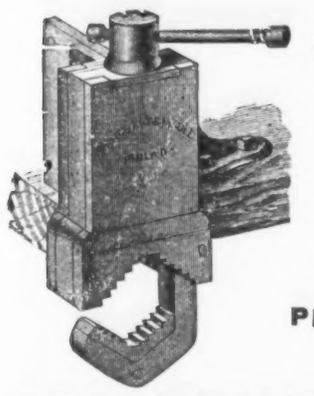
Per Box of 50 Feet.—Discount 50&10 % on single strength, 60&10 % on double.

Single Strength.

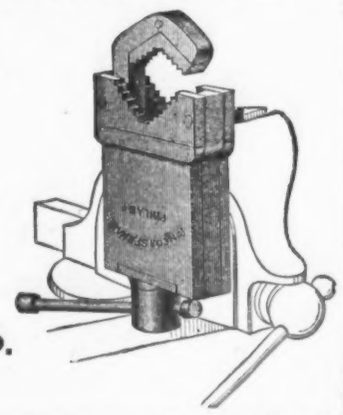
Size.	AA.	A.	B.	C.
6 x 8 to 10 x 15	$8.25	$7.50	$7.00	$6.50
11 x 14 to 16 x 24	9.25	8.50	8.00	7.25
18 x 22 to 20 x 30	10.75	9.75	8.75	7.75
15 x 36 to 24 x 30	12.25	10.75	9.00	8.50
26 x 28 to 24 x 36	13.00	11.50	9.75	9.00
26 x 36 to 26 x 44	14.50	13.25	10.75	9.50
26 x 46 to 30 x 50	15.00	14.00	11.25	10.25
30 x 52 to 30 x 54	16.00	14 50	12.00	
30 x 56 to 34 x 58	17.25	15.50	13.50	
34 x 58 to 34 x 60	18.25	17.25	15.00	
36 x 60 to 40 x 60	20.75	18.75	17.25	
Double Strength.				
6 x 8 to 10 x 15	12.75	11.75	10.75	10.00
11 x 14 to 16 x 24	14.50	13.25	12.50	11.25
18 x 22 to 20 x 30	17.25	15.75	14.00	
15 x 36 to 24 x 30	19.75	17.25	14.50	
26 x 28 to 24 x 36	21.00	18.50	15.75	
26 x 36 to 26 x 44	23.25	21.25	17.25	
26 x 46 to 30 x 50	24.00	22.50	18.00	
30 x 52 to 30 x 54	25.75	23.25	19.25	
30 x 56 to 34 x 58	27.75	25.00	21.75	
34 x 58 to 34 x 60	29.25	27.75	24.00	
36 x 60 to 40 x 60	33.25	30.00	27.75	

An additional 10 per cent. will be charged for all glass more than 40 inches wide. All sizes above 52 inches in length and not making more than 81 united inches, will be charged in the 84 united inches bracket.

IMPROVED PIPE-FITTERS' VISE.



STRONG,
LIGHT,
EFFICIENT,
CHEAP.



PRICE, $8.00.

To meet the requirements of the large number of persons who have use for such an article, we invite attention to our Improved Pipe Vise. This Vise can be used either as a permanent fixture to work-bench, attached to angle plate or can (unlike others) be held between the jaws of any Machinist's or Blacksmith's Vise; the movable jaw being OPEN ON SIDE permits work to be gripped at any desired point without slipping it in from end, and allows of FITTINGS BEING HELD securely; the Box is made of Malleable Iron, the Screw of Wrought Iron, and the remainder of Solid Steel throughout. The Steel Gripping Jaws can be duplicated and replaced at any time when worn out. It is a very convenient tool, well adapted to the wants of Plumbers, Pump Fitters, Well-Drivers, and all who have use for a tool that is *strong, light, efficient and cheap* which can be readily carried about with kit of tools.

MANUFACTURED BY

PANCOAST & MAULE,

243 and 245 South Third Street, Philadelphia.

Morse Twist Drill and Machine Co.,

NEW BEDFORD, MASS., Sole Manufacturers of

Morse Patent Straight-Lip Increase Twist Drill,

Beach's Patent Self-Centering Chuck, Solid and Shell Reamers.

BIT STOCK DRILLS,

Drills for Coes, Worcester, Hunter and other Hand Drill Presses. Beach's Patent Self-Centering Chucks, Center and Adjustable Drill Chucks, Solid and Shell Reamers. Drill Grinding Machines. Taper Reamers, Milling Cutters and Special tools to order.

All Tools exact to Whitworth Standard Gauges.

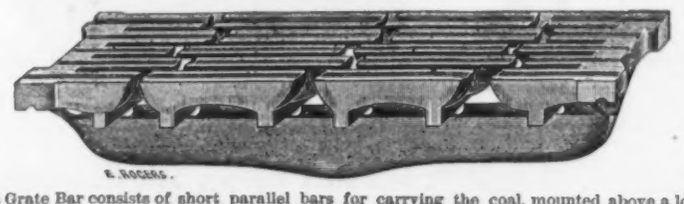
GEO. R. STETSON, Supt. EDWARD S. TABER, Treas.

DAVID S. CRESWELL,

816 Race Street, - - - - - PHILADELPHIA, PA.,

Manufacturer of

W. C. WREN'S PATENT GRATE BAR.



This Grate Bar consists of short parallel bars for carrying the coal, mounted above a long supporting bar, extending across the furnace by short transverse plates, holding the short bars, which sustain the heat so far above the supporting bar that it is kept comparatively cool, and is not, therefore, liable to warp, bend or burn. The bars which are subject to the heat, being made in short sections, do not strain the supporting bar. The short bars break joints at the meeting ends to prevent a straight open space across the whole; also to guide the rake used by firemen in cleaning the furnace better than they otherwise would.

We therefore claim the following advantages over other grate bars offered for sale:

1. Great saving in fuel.
2. Such construction as will equalize all strain resulting from expansion and contraction, thus avoiding warping, and thereby insuring long service.
3. Thorough combustion of fuel, owing to the large air spaces exposed.
4. Bars will not weigh more in proportion than the ordinary bar, and in addition to a saving of 25 per cent in fuel, will last much longer than any other bar in use.

The **WREN GRATE BAR** is in use at the works of the Atlantic Refining Co. and other prominent concerns.

Armstrong's Improved Adjustable Stock and Dies

FOR PIPE AND BOLTS.

Tapped to the U. S. and Whitworth Standard Gauges. *Adjustable* to all variations in the size of fittings. Can be *resharpened without drawing the temper* by simply grinding them. Possessing practical advantages appreciated by all mechanics. Circular and Price List sent free on application.

Manufactured by F. ARMSTRONG, 30 Sterling St., Bridgeport, Conn.

WILEY & RUSSELL MFG. CO.,

THE GREEN RIVER TIRE UPSETTER.

Greenfield, Mass.

LIGHTNING

Screw-Cutting Machinery and Tools.

Bolt Cutters, for hand or power.
Screw Plates, cutting from wire sizes to 1½ inch.
Green River Drilling Machines, for hand or power, with screw-cutting attachment.
Green River Tire Benders.
" Tire Upsetters.
" Tire Measuring Wheels
Tire Bolt Wrenches, Nut Wrenches.
Horse Shoers' Vises.
Taps and Dies for pipe, Bit Braces.
Taps, Dies and Reamers, &c., &c.

Send for Illustrated Price List.

The SWEETLAND Combination

Universal, Independent and Eccentric.

Price List and description furnished upon application.

SWEETLAND & CO., Sole Manf'rs,
126 Union St., New Haven, Conn.

CHUCK.

L. M. RUMSEY & CO.

MANUFACTURERS & JOBBERS OF

PUMPS & IRON WORKING MACHINERY.

LEAD PIPE & SHEET LEAD — BARBED WIRE FENCING — FENCE WIRE — PUMP CHAIN — GAS PIPE & FITTINGS

RAILWAY SUPPLIES,

PLUMBERS & STEAM FITTERS BRASS GOODS, — BELTING, HOSE, PACKING &c.

Nº 804 TO 820 N. SECOND STREET.

ST. LOUIS, MO.

Manufacturers of GALVANIZED PUMP CHAIN FOR CHAIN PUMPS.

PATENT

Expanding, Self-Draining

RUBBER BUCKET.

Manufactured only by

L. M. RUMSEY & CO.

PHILADELPHIA SCREW CO., Limited,

Twelfth and Buttonwood Streets, PHILADELPHIA.

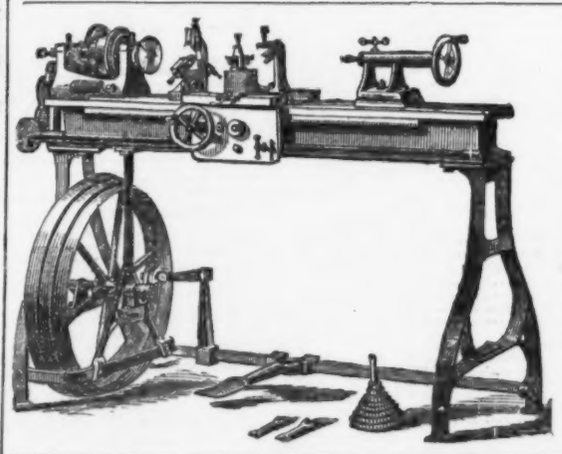
"TRADE MARK" BEST COAL CHAR IRON WOOD SCREWS

Manufacturers of

IRON & BRASS WOOD SCREWS.

Quality, finish and tests as to strength guaranteed equal to any in the market.

With improved facilities and largely increased capacity for production, we can fill orders promptly, and invite inquiries for discounts. A full line in stock.



Israel H. Johnson, Jr., & Co.

TOOL & MACHINE WORKS,

Manufacturers of

ENGINE, BRASS FINISHERS', WOOD TURNERS', AMATEURS' and JEWELERS' **LATHES.**

Slide Rest, Screw Machines, Turret Heads, Screw Presses, Screw Clamps, Lathe Carriers, &c.

440 N. 12th St., above Noble, Philadelphia, Pa.

Israel H. Johnson, Jr. *Joshua R. Johnson, Jr.*

A. J. DAVIS & CO.,

Patent Friction Hoisting Engines

For Mines, Quarries, Dock Building, &c.

MANUFACTURERS OF

SHAPERS, DRAIN PIPE MACHINES, BAG AND SATCHEL MACHINERY,

Steam Engines, Wire Drawing Machinery, &c., &c.

69 N. J. R. R. Avenue, Newark, N. J.

Correspondence solicited.

"BLAKE'S CHALLENGE" ROCK BREAKER.

Patented November 18, 1879.

BLAKE CRUSHER CO., new Haven, Conn., Sole Makers.

Awarded First-Class Medal of Superiority by the American Institute 1879.

Rapidly superseding all old styles of **Blake Crushers,** on account of its superior strength, efficiency and ease of adjustment. Adopted in preference by leading Mining and Railway companies, and many important cities and towns. Blake Crushers of our older style, containing patented improvements **exclusively our own,** for sale at low figures. The public is cautioned to beware of the representations of certain parties who have **imitated** our patterns of these, **copied our old cuts,** and are advertising **"Blake Crushers" weighing 1300 pounds less than ours,** at same price. For circulars relating to the new **"Blake's Challenge,"** and all older styles of Blake Crushers, address

BLAKE CRUSHER CO., New Haven. Ct.,

Patentees and Original Manufacturers under patents of Eli W. Blake and Theo. A. Blake.

The Farrel Foundry and Machine Co.

View of Rock Breaker.

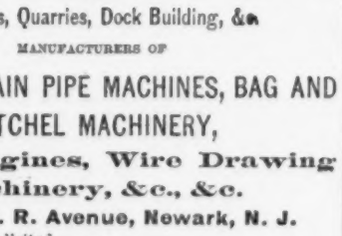
ANSONIA, CONN.,

Manufacture improved

ROCK & ORE BREAKERS,

(THE "BLAKE" STYLE),

designed for breaking to small pieces and one-third dust all kinds of hard and brittle substances, such as **Quartz, Emery, Gold and Silver Ores, Coal, Plaster, Iron, Copper and Lead Ores;** also, **Stone** for making **Concrete and Railroad Ballast.**



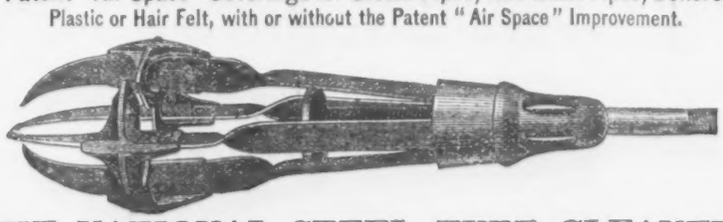
Premium of Excellence, American Institute Fair, 1879.

Twenty years of practical test, at **Home** and **Abroad,** has proven this machine to be the best one ever invented for the purpose. Mr. S. L. MARSDEN, for the past fifteen years connected with the manufacture of these machines, has charge of this department of our works, and will personally superintend their erection within a reasonable circuit. **Chilled Rolls and Rolling Mill Machinery; Power Presses,** single and double acting; also, **Hammers,** Drops and Lifters; **Shafting, Pulleys and Hangers.**

ASBESTOS MATERIALS, FIBER, MILLBOARD, PACKING AND CEMENT.

The Patent "Air Space" Coverings for Steam Pipes, Hot-Blast Pipes, Boilers, &c.

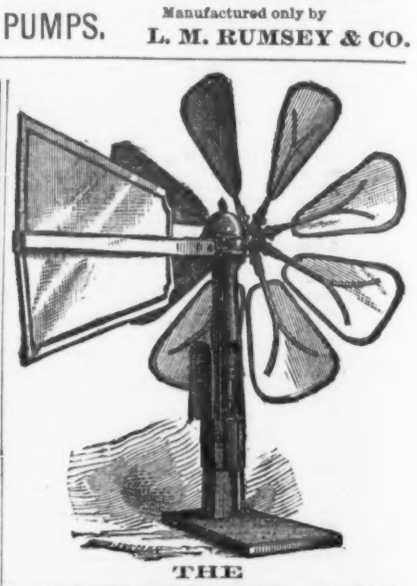
Plastic or Hair Felt, with or without the Patent "Air Space" Improvement.



THE NATIONAL STEEL TUBE CLEANER.

Saves its cost every time it is used.

THE CHALMERS-SPENCE CO., foot 9th St., E. R., New York.



THE

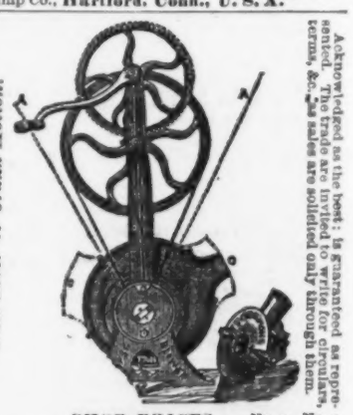
HARTFORD COMPRESSED AIR PUMP

Water Driven to any Hight and Distance by Compressed Air.

Country Houses Supplied Cheaply and Certainly for Bath Rooms, Water Closets, Hot and Cold Water Faucets, &c. Plenty of Fresh Water for Stock on Farms. The best Pump for Irrigating, supplying Railroad tanks, and for Mining purposes. For Circular and Price list address, **EZRA BROOKS,** Sec'y and General Manager of The Hartford Compressed Air Pump Co., **Hartford, Conn., U. S. A.**

The Improved Eclipse Fan Blower.

With Lever or Crank Motion.



Acknowledged as the best: is guaranteed as represented. The trade are invited to write for terms, &c. Sales are solicited only through them.

SHOP PRICES.	No. 1.	No. 2.
Improved "Eclipse" Fan Blower and Tuyere Iron, complete	$27.00	$18.00
Improved "Eclipse" Fan Blower, without Tuyere Iron	25.00	16.00
Improved "Eclipse" Fan Blower, complete, with Lever Attachment	30.00	20.00
Improved "Eclipse" Fan Blower, without Tuyere Iron & with Lever Att'chm't	27.00	18.00
Tuyere Irons alone	3.00	2.00

The above includes a Patent Adjustable Elbow and Pipe, Oil Can, &c.

Exhausters for ventilating mines, complete	28.00	20.00

Full printed directions for working accompany every machine.

EZRA F. LANDIS,
Sole Manufacturer, **Lancaster, Pa.**

THE NEW

PULSOMETER

Is more economical in points of original cost, expense for repairs and running expenses, **than any** other steam pump in the world.

Simple and compact, with no machinery whatever to oil, or get out of order, it stands at the head of all means of elevating water or other liquids by steam. It needs no skilled labor to look after it.

Send for book giving full description, reduced prices and many letters of commendation from leading manufacturers and others throughout the country who are using them.

PULSOMETER STEAM PUMP CO.,
Sole owners of Hall's Patents in the U. S.,
131,515 to 131,543, both inclusive, and
THE NEW PULSOMETER,
Office, **No. 83 John St.,**
P. O. Box No. 1533, New York City

THE "EDDY" STRAIGHTWAY

VALVES.

ALSO,

FIRE HYDRANTS.

Axe, Hatchet, Powder and Brush Machinery.

MOHAWK & HUDSON MFG. CO.,
WATERFORD, N. Y.

BENTON, FAULKNER & BIRD, N. Y. Agents.
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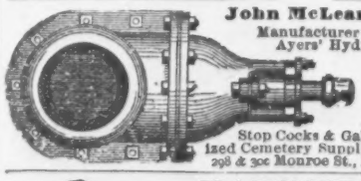

John McLean,
Manufacturer of
Ayers' Hydrants

Stop Cocks & Galvanized Cemetery Supplies,
298 & 300 Monroe St., N. Y.

O. F. DANA, N. E. AG'T.

BARBER'S
PATENT
COUNTERSINK.

Diploma awarded at Mechanics' Fair, Boston, 1878. Hole bored any depth, and countersunk for any size screw at one operation. $2 per doz.; discount in quantity. Sample by mail 50 cts. D. F. BARBER, 1341 Washington St., Boston.

BOSTON.

Reported by Macomber, Bigelow & Dowse, 156 to 164 Oliver St.

Anvils.—"Eagle American" ₩ lb 9½c. dis 20 %
Apple Parers.
Reading "8" per doz., $7.50
Reading "76" per doz., 6.00
Reading "72" per doz., 5.00
Goodell Turn Table per doz., 5.52
Goodell Improved Turn Table per doz., 7.50
Goodell Family Corer and Slicer per doz., 7.00
Hudson's Improved "80" per doz., 6.50
Goodell Lightning per doz., 6.00
Aiken's Tools dis 40&10 %
Anvil & Vise.—
No. 1, $4.25; 2, 4.25; 3, 3.50 each dis 25 %
Augurs & Bitts.—Snell's Auger dis 40 %
L'Hommedieu's Ship Augers dis 15 %
Jenning's Bitts dis 10&10&10 %
Cook's Bitts dis 40&10 %
Shepardson's Double-Cut Bitts dis 25 %
" " Gimlets dis 40 %
Stearn's Extension Hollow Augers—
No. 2, ₩ doz, $48.00, No. 3, ₩ doz, $60.00 list, dis 20 %
Bonney's Extension Hollow Augers ₩ doz $36.00
Pierce's Bitts dis 35 %
Griswold " dis 40 %
Axes.—Blue Jackets per doz 9.00
Red Cross per doz 8.00
Handled per doz 12.00
Dowse Boys' dis 30 %
Ax Handles.—
Oak Extra, 31 in., No. A ₩ doz $2.00
" 34 in., No. A ₩ doz 2.25
" 31 in., No. B ₩ doz 1.50
" 34 in., No. B ₩ doz 1.75
" 31 or 34 in., No. C ₩ doz 1.15
Axle Clips dis 10 %
Balances.—Chatillon's dis 15&10 %
Barn Door Rail.—
Cast Angle (for Anti-Friction Hangers) per ft. 30
" Half-Round per ft. ⅝, 50 ⅞, 65c
Wrought " per ft, ⅝, 40; ⅞, 50; 1¼, 60
Bells.—Connel's Crank Gong reduced list dis 20&10 %
Bird Cages.
Japanned M. B. & D., reduced list, 1879 dis 40 %
Brass " " 1879 dis 33⅓ %
Blind Fasts.—Lock Fasts ₩ C sets $6.00
No. 6 Fasts ₩ C sets 6.50
Veazie Fasts ₩ C sets 6.50
Sheddʼs ₩ C sets 7.00
Blind Hinges.—Mall. Hook, 3 holes ₩ C sets 8.50
Brad Awl Handles.—
Phœnix Adjustable ₩ doz $2.00
Bolts.—Norway Iron Carriage dis 70&5 %
Common " dis 80&5 %
Borax.—Refined ₩ lb 12c
Boring Machines.
Eagle Upright each, $5.50 list
Eagle Angle each, 6.75 list } dis 40 %
Snell Augers ₩ set 4.70
Braces.—Barber's dis 40 %
Spofford's dis 50 %
Backus' dis 50 & 10 %
Bracket Saws.—Holly Scroll Saw each, $2.50
Demas Lathe and Scroll Saw " 6.00
Bracket Saws, extra quality, to No. 6 ₩ gro $0.75
Steel Frame, with patterns ₩ doz 6.50
Lester dis 20 %
New Rogers, all iron dis 25 %
Bracket Saw Blades.
Griffith's patent ₩ gross 75c
Brackets.—H. B. & M. Flower Pot reduced list—
dis 25&10 %
Bronzed Shelf, M. B. & D. newlist dis 50 %
Store Shelf dis 40 %
Bronze Hardware.—
Butts.—Union Fast Joint dis 40&10 %
" Loose " dis 50&10 %
" Japanned Acorn dis 55&10 %
" Silvered " dis 55&10 %
" Boston Finish dis 75&10 %
Union Spiral Spring dis 40 %
Wrought Brass dis 45 %
Carriage Bolts.—Eagle Norway dis 70&5 %
Common dis 80&5 %
Carriage Jacks.
"Climax" No. 1 ₩ doz $20.00
" No. 1½ " 14.00
" No. 2 " 12.50
"Universal" dis 25 %
" No. 1 each, $2.00
" No. 2 " 3.00
" No. 3 " 6.00
" No. 4 " 6.00
" No. 5 " 6.50
Cartridges.—U. S. Cartridge Co. dis 60&10 %
Cards.—Watson's makeHorse and Curry dis 10 %
" Cotton dis 10 %
" Wool dis 10 %
Casters.—Bed and Table dis 25&10 %
Chain.—Traces 6½, 10, 4, streight ₩ pair 45c
" 6½, 10, 4, twisted ₩ pair 60c
" 7, 12, 2, " ₩ pair 75c
Coil 3-16 ₩ lb 11 c
" ¼ ₩ lb 8½c
" 5-16 ₩ lb 8 c
" ⅜ ₩ lb 7 c
" 7-16 ₩ lb 6½c
" ½ ₩ lb 6½c
Chalk.—White, Carpenter's ₩ gross 90c
Red, Carpenter's ₩ gross 8.00
Blue " ₩ gross $1.00
Chisels.—Hart, Bliven & Mead, Framing dis 5&5&10 %
Underhill, Framing dis 20 %
Buck's Chisels dis 30 %
Clothes Line.—
Galvanized Wire, 100 feet each ₩ doz $4.50
Coat Hooks.—"Dover."—Galvanized, new list dis 50 %
Japanned, new list dis 50 %
Coffee Mills.—New list dis 35 %
Copper Rivets dis 35 %
Cow Ties.
No. 30, 3 ft. No. 6 Wire, with toggle ₩ doz $3.00
No. 35, 3 ft. " " with snap ₩ doz 3.80
No. 40, 3½ ft. " " with toggle ₩ doz 3.90
No. 45, 3½ ft. " " with snap ₩ doz 4.10
No. 50, 4 ft. No. 4 " with toggle ₩ doz 4.50
No. 55, 4 ft. " " with snap ₩ doz 4.75
No. 60, 4½ ft. " " with toggle ₩ doz 5.50
No. 65, 4½ ft. " " with snap ₩ doz 5.25
Cocks.—Brass, L. F. & C. dis 40 %
Cordage.—Manila, usual trade dis ic. ₩ lb 13c
Jute ₩ lb 9c
Crow-Bars.—Cast Steel ₩ lb 6c
Iron Steel Pointed ₩ lb 5c
Cutlery.—Pocket, American Shear Co.'s dis 40 %
Butcher Knives, "Woods," Lap Bolster.
Square Handle dis 20 %
Steak Knives dis 10 %
Lap Bolster, Oval Handle dis 10 %
Sticking dis 20 %
Skinning dis 20 %
Butcher, Common Round Handle, "Woods" dis 20 %
Shoe Knives, "Woods" dis 10 %
Dividers.—Cook's dis 25 %
Dog Collars dis 20 %
Dog Muzzles.—Automatic dis 10 %
Door Springs.—Torrey's Rod ₩ doz $2.00
Imitation Torrey's Rod ₩ doz $1.75
Gem Coil net list
Crown ₩ doz $1.20
Warners ₩ doz $2.00
Door Stops.—"Thurston's" dis 45 %
Drawer Knobs.—"Thurston's" dis 45 %
Drills.—Morse Bitt Stock dis 25 %
Morse Straight Shank dis 20 %
Emery.—Wellington Mills ₩ lb
The Alden Emery Co. ₩ lb
Turkish in 10 lb cans ₩ lb
Enamelled Ware.
Standard Mfg. Co. Kettles dis 40&10 %
" Sauce Pans dis 25 %
Felloe Plates.—Wrought ₩ lb 9c
Files.
American File Co. dis 30 %
Nicholson " dis 30 %
Fluting Machines.
Knox list, $1.00 dis 10 %
American list, $3.40 dis 10 %
Forks. W. C. & Co., Manure dis 40 %
Gimlet Bitts.
Genuine German, No. 125, 1-32 to 8-32, per doz $1.00
Pierce's per doz 580
Glass Cutters.
Combination Class Cutter and Knife Sharpener ₩ doz $1.00
Grub Hoes.—K. P. & Co.'s No. 2, 11.50 ₩ doz. dis 30 %
Hammers.—Maydole's dis 10 %
Hammond's (new list.) dis 20 %
Hangers & Rollers.—Anti-Friction dis 50&10 %
Acme Rollers dis 50 %
Climax dis 50 %
Common Hangers dis 35&10 %
" Rollers dis 35&10 %
Hand Screws dis 10 %
Hatchets.—C. F. Dowse new list dis 30 %
Underhill dis 25 %
Hay Knives.—Lightning ₩ doz $18.00 net
Fisher's Patent ₩ doz @14.00
Hinges.—Strap and T (new list) dis 45&10
Providence Plate ₩ lb 45
Wrought Screw Hook ₩ lb 45
Hoes.—W. C. & Co.'s dis 40 %
Hooks and Staples.—Brewers' dis 40 %
Horse Nails. No. 6 7 8 9
National Finished .23 .21 .20 .19 dis 20 %
Putnam Pointed .26 .24 .23 .22 10 %
Horse Nails.—Bridgewater dis 25 %
No. 6 24; No. 7, 21, No. 8, 20; No. 9, 19.
Ice Cream Freezers.—"Packer's" dis 40 %
Knobs.—"Norwalk." New list dis 50 %
Silver Glass dis 50&10 %
" Bell Pulls dis 50&10 %
Lanterns.—Tubulars, No. 99 ₩ doz 7.50
Railroad, Oil, No. 43 ₩ doz 9.00
Triangular ₩ doz 4.00
Hurricane dis 20 %
Lead.—Sheet ₩ lb 7 c
Pipe ₩ lb 6½c
Locks.—Norwalk Genuine Bronze Goods dis 50 %
Eagle Cabinet dis 10 %
" Trunk list net
W. Wilcox & Co., Padlocks dis 40 %
American Lock Co.'s Steel Key dis 33⅓ %
Manure Forks.—W. C. & Co. dis 40 %
Mattocks.—K. P. & Co., Long Cutter, 18.00 ₩ doz. dis 30 %
K. P. & Co., Short Cutter, 15.00 ₩ doz. dis 30 %
" " Pick " 16.00 ₩ doz. dis 30 %
Measuring Tapes.—Eddy's dis 20 %
Meat Cutters.—Miles' Challenge dis 30 %
Hale's, (New list) dis 40 %
American dis 25 %
Money Drawers.—Tucker's Alarm ₩ doz $22.50
Mouse Traps.—Delusion ₩ doz 2.00
Novelty ₩ doz 1.75
Nails ₩ Keg, 3.15 rates
Oilers.—Zinc and Tin dis 45 %
Brass and Copper dis 3½ %
Ox Bows.—Extra finished and varnished list net
1¼ in., ₩ doz. pair, $5.75 | 2 in., ₩ doz. pair $9.00
1¾ in., " " " 8.00 | 2½ " " " 11.00
Padlocks.—W. Wilcox & Co.'s dis 40 %
Paper.—Tarred Sheathing ₩ lb 2½c
Dry Sheathing ₩ lb 2½c
Picks.—K. P. & Co., Adze Eye, 5 to 6 lb 12.00 dis 30 %
" " " 6 to 7 lb 13.00 dis 30 %
Planes.—Greenfield Tool Co. dis 25 %
N. Y. Tool Co. dis 25 %
English Iron dis 20 %
Bailey's dis 20&10
Plated Ware.—Rogers & Bro. dis 33⅓&5
Pliers.—Vom Cleff & Co.'s net list
Button's Wire Pliers dis 33⅓ %
Plumb & Levels.—Stanley, R. & L. Co. dis 60&10 %
Pocket Knives.
American Shear Co.'s dis 33⅓&10 %
Potato Diggers.—W. C. & Co. reduced list dis 40 %
Pulleys
Acme or Excelsior, 1¾ in. per doz 2.10
" " 2 in. " 2.60
Pulley Blocks dis 40 %
Pumps.—Union Manufacturing Co.
Iron Cistern dis 35 %
" Pitcher Spout dis 35 %
Copper dis 30 %
Rivets.—Black dis 40 %
Carriage in ic lb papers dis 20 %
Copper dis 35 %
Razors.—Torrey's dis 10 %
Razor Strops.—Torrey's Full line.
Rules.—Stanley, Boxwood, dis 60&10 %
" Ivory, dis 50&10 %
Sadirons.—Common ₩ lb 3½c
Laundry ₩ lb 6½c
Tailor's Grease ₩ lb 6½
Enterprise, "Potts" dis 35 %
Sash Locks.—King & Hutchinson's, new list dis 40 %
Sandpaper.—Baeder & Adamson dis 25 %
M. B. & D. dis 25&10 %
Sash Weights.—Patent Eye ₩ lb 13½c
Saws.—Hand Saws, Disston's dis 20 %
Wheeler & Clemson dis 20 %
Cross-Cut Saws.
W. M. & C., Common Tooth, No. 1 ₩ foot 35c
" " Champion " ₩ foot 35c
Disston's, Common " ₩ foot 40c
" " Gt. American " ₩ foot 40c
Boynton's Lightning " ₩ foot 45c
M. B. & D., Hand Saws dis 25 %
W. M. & Co.'s Circular Saws dis 35 %
Richardson Bros. dis 25 %
Saw Blades.—Disston dis 25 %
W. M. & C. dis 15 %
Welch & Griffith, Extra ₩ doz $8.40
" " No. 2 ₩ doz 7.00
Scales.—Fairbanks dis 20 %
Screws.—Aiken's Flat-Head Iron dis 45 %
American Flat-Head Iron dis 45 %
" " Brass dis 35 %
" Round-Head " dis 20 %
" " Iron dis 35 %
Grilley " Nickel-plated Common dis 40
Scythes.—Clippers, in boxes ₩ doz $9.00
Shaves.—Kimball's ₩ inch 75c
Watrous dis 15 %
Shears.—American Shear Co., new list dis 70 %
Shot.—Tatham's ₩ lb 7½c
Shovels.—O. Ames, new list. dis 10 %
O. Ames, other brands, new list dis 10 %
M. B. & D. dis 10 %
Oxford Birmingham Pattern dis 15 %
Sinks.—Magee Patent dis 30 %
Snow Shovels.—Malleable tips
Skates.—Union dis 25 %
Acme dis 20 %
Stock and Dies.—King's dis 10&5 %
Taps.—A. Field & Son's dis 20&10 %
Pittsfield dis 15&10 %
Swedes Tinned 25&10 %
Swedes Iron 20&10 %
Gimp and Lace 20&10 %
Copper Tacks 25&10 %
All balances on list 15&10 %
Traps.—Oneida, Genuine dis 33⅓ %
Oneida, Imitation, H. & N. dis 50 %
Blake's dis 40 & 10 %
Vises.—Simpson's Adjustable dis 25&5 %
Howard Vise Co. dis 25 %
Prentiss' dis 20 %
Weather Strips.—Packer's ₩ doz $1.50
Browne's Flexible Rubber dis 30 %
In 20 feet boxes; No. 1, ½ in. wide, ₩ yard, 10c.; No. 2, ⅝ in., 12c.; No. 3, ¾ in., 20c.; No. 4, 1 in., 25c.
Black Walnut Spring Weather Strips ₩ doz. $4.00
Window Springs. dis 20 %
Babcock's No. 3 ₩ gross $2.25
" " 4 ₩ gross 4.15
Wire Cloth.—"Clinton" ₩ ft. 3½c
Wire Fence.
Scutt's Patent, Painted ₩ lb 7½c
" Galvanized ₩ lb 8½c
Wire Goods.—Gate Hooks and Eyes, &c new list. dis 60&10 %
Wrenches.—A. G. Coe's dis 50 %
Girard Mfg. Co. dis 50&10 %
Girard Agt. dis 50 %
Wringers.—Universal, No. ₩ doz $63.00
Universal, No. 1½ ₩ doz 60.00
Novelty, No. 10. ₩ doz 60.00
" No. 2 ₩ doz 65.00
" No. 22 ₩ doz 67.00
Excelsior, No. A ₩ doz 71.00
" No. B ₩ doz 83.00
" No. CC ₩ doz 105.00
Novelty Set Tub, E ₩ doz 96.00
Eureka ₩ doz 54.00
Keystone, Wood Frame No. 1½ ₩ doz 51.2
" Iron Frame No. 2½ ₩ doz 61.
Zinc ₩ lb 7½

Withington, Cooley & Co.—Hoes, Rakes, Forks &c dis 40 %. Special rate for Export.

Passenger & Freight,
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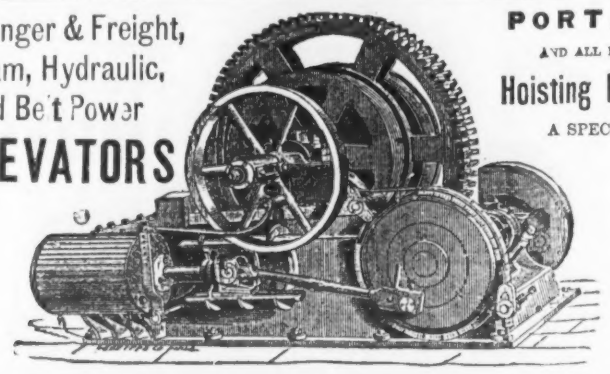

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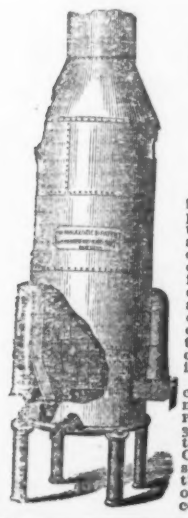

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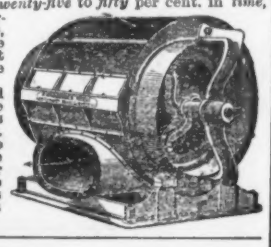
This Cupola has made a great revolution in melting Iron. It differs from all others in having a CONTINUOUS TUYERE, or in other words, the blast enters the fuel at all points. Above one ton capacity per hour, they are made *oval in form*. This brings the blast to the center of the furnace with the *least resistance* and *smallest* possible amount of power, and in combination with the continuous Tuyere causes complete diffusion of the air throughout the furnace, and uniform temperature, melting *ten* or *fifteen tons* an hour with the pressure of blast required to melt *two* or *three tons* in an ordinary Cupola. It also enables us to save very largely in *time* and *fuel*, the experience of our customers showing a gain of *twenty-five* to *fifty* per cent. in *time*, and *twenty-five* to *forty* per cent. *fuel* over the ordinary Cupola, and a BETTER QUALITY OF CASTING, especially in light work. This is due to the thorough diffusion of the air and more perfect combustion, extracting less carbon from the iron, making a softer and tougher casting.

We manufacture these Cupolas of any desired capacity, numbered from 1 to 20, inclusive, the numbers indicating the melting capacities in TONS PER HOUR—No. 1, one ton, ; No. 2, two tons; No. 3, three tons per hour, and so on up to 15, or 20 tons. We have *improved* the *construction* of these Cupolas in every way, have increased their strength and durability, and sought to make them as convenient for working and repairs as our own and the experience of our customers could suggest.



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No. 2	" " "		¼ to 1¼
No. 3	" " "		½ to 2
No. 4	" " "		1½ to 3
No. 5	" " "		2½ to 4
Size A	threads bolts		¼ to ¾
Size B	" "		¼ to 1

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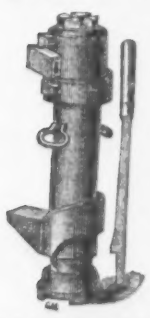

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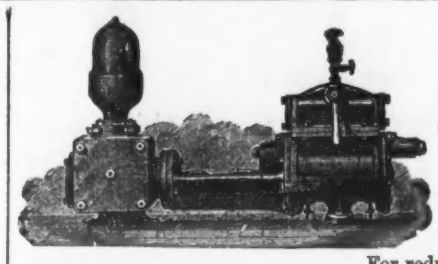

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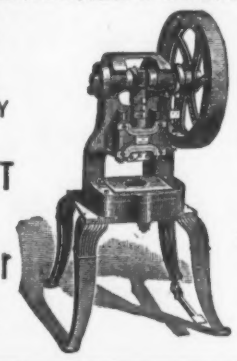

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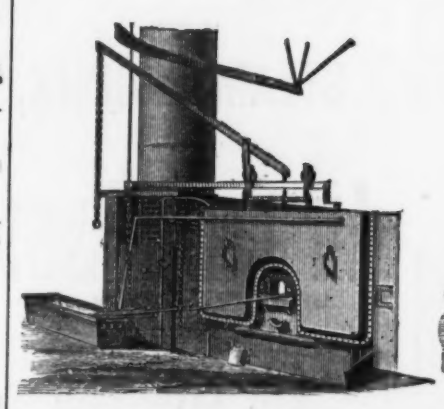

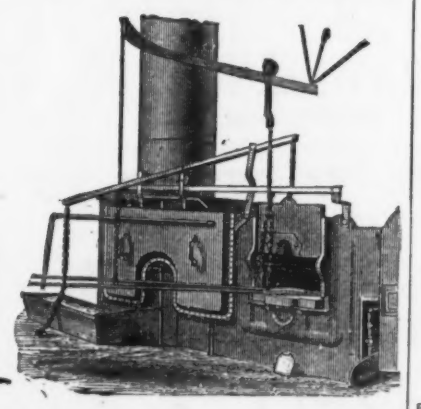

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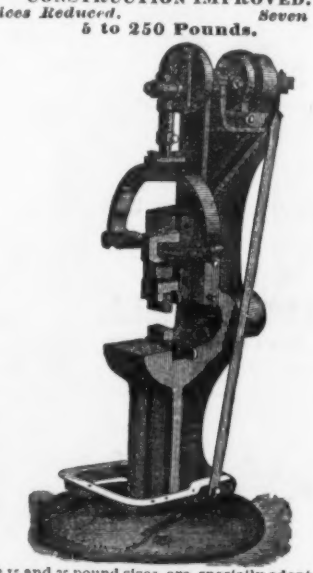

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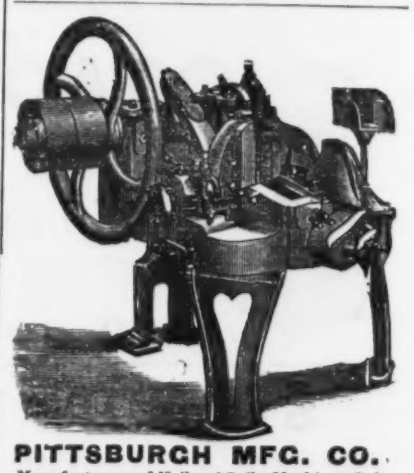

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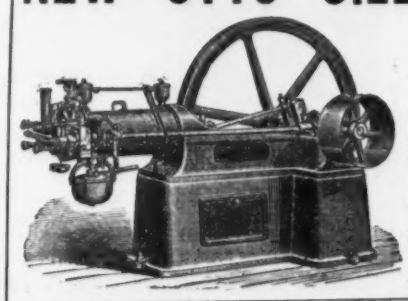

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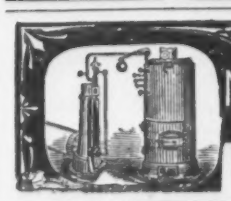

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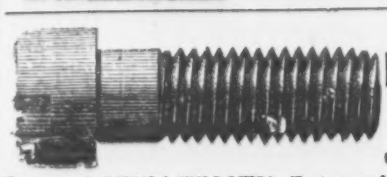

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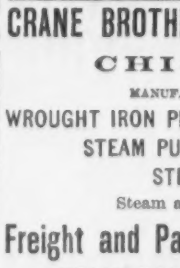

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2¼	32.00	37.00	2.40	7.00
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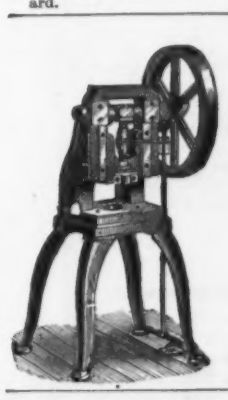

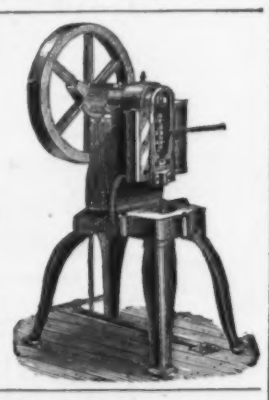

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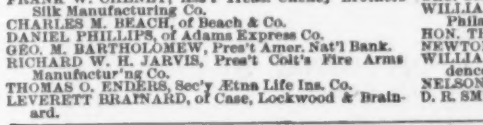

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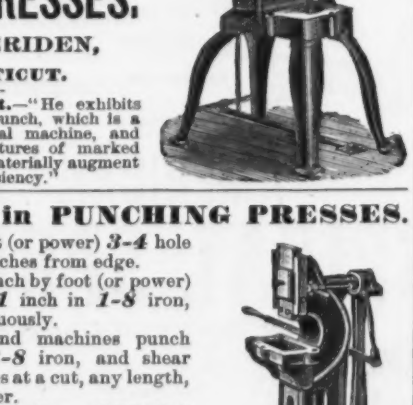

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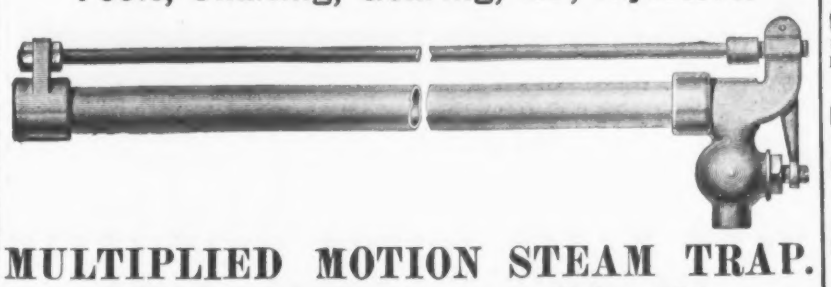

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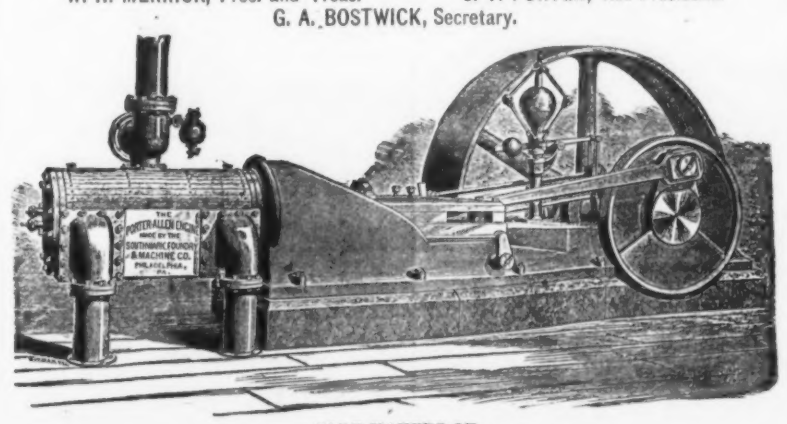

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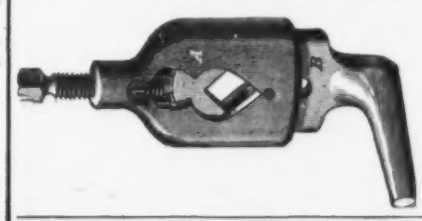

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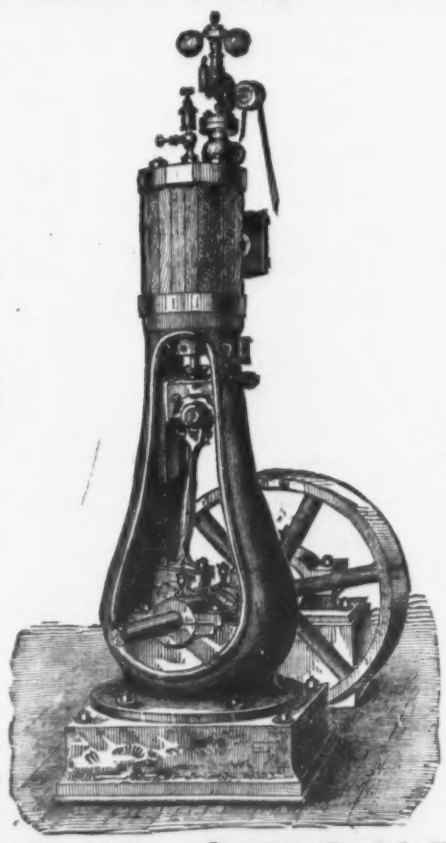

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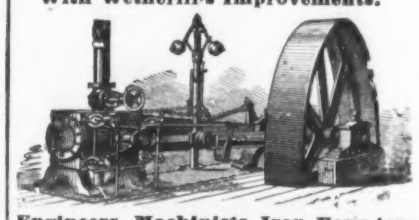

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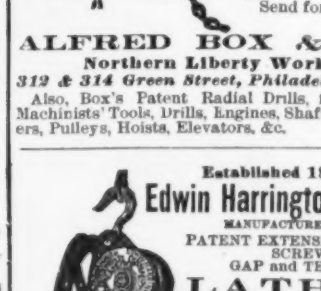

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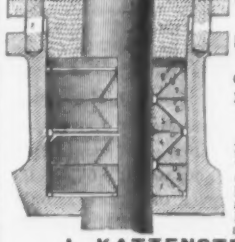

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